Osteoclastoma of the thoracic spine

Case report

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A case of osteoclastoma arising in the body of the T-9 vertebra is presented. Osteoclastoma rarely involves the vertebrae, and treatment, whether by surgery or radiotherapy, seldom results in eradication of the lesion or prevention of recurrence.

KEY WORDS - osteoclastoma - giant cell tumor - spinal neoplasm

OSTEOCLASTOMAS are uncommon, but their sites of predilection are well known. Apart from the sacrum, the vertebral column is one of the least likely areas to be affected. This paper reports a case of cord compression caused by an osteoclastoma of a dorsal vertebra.

Case Report

A 45-year-old woman was referred to the Neurosurgery Unit at University College Hospital. For a few days she had had pain in the dorsolumbar region, which radiated around both sides of the lower chest, with tingling sensations and gross weakness of both lower limbs. About 3 months earlier she had experienced a similar pain without neurological symptoms, but it had resolved within a few weeks.

First Admission. Examination revealed a moderately severe lower extremity paraparesis, impaired sensibility to pain below the L-1 level, brisk tendon reflexes in the lower limbs, extensor plantar responses, and absent abdominal reflexes. She was unable to pass urine or to walk. X-ray films of the spine showed compression of the body of T-9, with irregularity and loss of the end-plates; there was no obvious involvement of the posterior elements. A soft tissue shadow could be seen on both sides of the spine. Myelography revealed a complete block at the level of T9-10. Laminectomy of T7-9 performed on June 20, 1974, did not reveal any obvious tumor in the spine, laminae, or pedicles, but reddish-gray tumor tissue was seen protruding from in front of the theca on either side. Most of the accessible tumor tissue was removed and an adequate decompression achieved. Histological examination showed the tumor to be moderately differentiated osteoclastoma with some variation in size and moderate numbers of mitoses in the nuclei of the polygonal and spindle cells between the giant cells (Fig. 1). No bone was seen in this mass. A separate piece of bone from the lamina appeared normal.

After the operation the patient made a good recovery, regaining almost full power in the lower limbs, but not normal bladder function. She was given a course of deep x-ray treatment with cobalt-60, receiving a total
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Fig. 1. Left: Osteoclastoma with giant cells scattered among polygonal and spindle cells and blood vessels. H & E, × 100. Right: Higher magnification shows mitosis in polygonal cell near center of field. H & E, × 400.

tumor dose of 4300 rads over a period of 32 days.

Second Admission. About 2 months postoperatively, the patient noticed weakness of both legs that rapidly progressed to a gross paraparesis with impairment of all modalities of sensation in the lower limbs and trunk to the T-10 level. X-ray films of the spine showed collapse of the body of T-9 and an increase in the paraspinal soft tissue shadows. A cisternal myelogram revealed a complete block at T-8. A second operation was performed on August 21, 1974. At the level of T-9 a reddish tumor mass about 1 in. in diameter lay dorsolateral to the cord on the left side; a small amount of tumor was also visible on the right side of the cord. All visible tumor was removed piecemeal and the cavity in the collapsed vertebral body thoroughly curetted. Histological examination showed this tumor to be similar to that removed previously but rather more vascular.

Postoperatively the paraparesis was even more profound, and within days the patient could not move her legs at all. She was left with essentially a spastic paraplegia; she had gross impairment of sensation below T-10 and retention of urine for the following 4 months. At this stage some power gradually returned to the legs, and sensation was partially recovered. Improvement continued, so that 6 months after the second operation she was able to walk with the help of a Zimmer frame. She had regained moderate bladder function, and was self-sufficient in most daily activities. X-ray films of the spine at that time showed no paraspinal soft tissue shadow and no further erosion or collapse (Fig. 2).

Third Admission. In May, 1975, she presented again complaining of girdle pains round the right side of the chest and dyspnea on exertion, which had started 2 days earlier. There were no signs of further neurological involvement, and indeed she now had almost
normal power in her legs, although she still had mild impairment of superficial sensations, impaired proprioception, and an ataxic gait. She was found to have a massive right pleural effusion; x-ray films of the chest showed a large paravertebral soft tissue shadow on the left side of the collapsed T-9 body. We performed repeated aspirations of the heavily blood-stained effusion, in which no tumor cells were seen; the effusion regressed, and x-ray films of the chest showed that the tumor had spread into the paravertebral region on the right side (Fig. 3). The patient was by this time free of pain and dyspnea. It was decided that the growth was too far ad-
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advanced for total surgical resection with bone grafting to be feasible without considerable hazard to the cord, and that radiotherapy would not be helpful. The patient was discharged, and when last seen her condition had remained unchanged.

**Discussion**

The sacrum has its fair share of osteoclastoma, whereas the rest of the vertebral column is very rarely affected. Not until the views of Jaffe and his coworkers came to be accepted was the osteoclastoma or giant cell tumor of bone distinguished from the numerous other lesions with which it used to be confused. The rarity of osteoclastoma of the vertebrae then became apparent. Cohen, et al., reviewed 413 cases of spinal tumor seen at the Mayo Clinic over a 50-year period and found only two giant cell tumors occurring in vertebrae and 14 in the sacrum. In another review by Dahlin, et al., only six out of 195 giant cell tumors occurred in vertebrae, while 19 were in the sacrum. Goldenberg, et al., collected 218 cases of giant cell tumors, three of which occurred in vertebrae. Schajowicz, in a survey of 85 cases spanning a 20-year period, found only two giant cell tumors in vertebrae. Hutter, et al., reviewed 76 verified cases of giant cell tumor, and McGrath collected 52 cases from the Bristol Bone Tumour Registry; in neither series were there any cases involving the vertebrae. Our case was the only instance of osteoclastoma affecting the spine seen in this hospital over the past 25 years.

The radiographic appearance of osteoclastoma has been described by many, although some features are characteristic of the lesion, most authors agree that the x-ray picture is not diagnostic. This is particularly true of cases involving the spine (as well as other nontubular bones), where the lesion often appears simply as an area of rarefaction or bone destruction, without any distinctive features. The x-ray films of the lesion in our case offered no clue to the diagnosis.

The debate concerning the relative merits of the various methods of treatment available would not usually affect the initial decision taken in a case of vertebral osteoclastoma.

In cases of vertebral osteoclastoma, a preoperative diagnosis is most unlikely. Operative treatment is often mandatory to relieve cord or cauda equina compression. In the treatment of osteoclastoma in general, it appears that total resection of the lesion, where this is practicable, gives the best results. In vertebral tumors surgical resection will usually be limited, except for small lesions confined to the posterior elements or a transverse process, or in the case of some sacral tumors. However, some recent reports describe vertebral osteoclastomas treated by total excision of the whole or the major portion of one or more vertebrae, including the bodies, with cortical or cancellous bone grafting or both for reconstruction, with or without internal fixation.

In our case, irradiation did not control the disease. In fact it seems that the tumor continued to grow even while the patient was receiving radiotherapy. The neurological improvement that first started several months after the completion of treatment may indicate that irradiation produces a delayed effect on the tumor. Even if this were so, the effect could only have been very short-lived. Radiotherapy has lost favor among most physicians as a useful weapon against osteoclastoma. Protagonists of x-ray treatment, such as Prossor and Windeyer and Woodyatt, based their conclusions on series of cases where some or most of the cases were diagnosed on clinical and radiological grounds alone, or where the periods of follow-up were not sufficiently long. More recent studies, in which the diagnosis of the cases reported was carefully reviewed, indicate that radiotherapy is not very effective against osteoclastoma. Johnson and Dahlin, in an analysis of 116 cases from the Mayo Clinic, found that irradiation after biopsy was unsuccessful as a primary treatment in all 13 cases so treated. In another paper, Dahlin, et al., concluded that irradiation combined with various surgical procedures did not enhance the effects of those procedures: osteoclastoma recurred in 47.2% of patients who received irradiation, as opposed to 42.6% of those who did not. Goldenberg, et al., also concluded that osteoclastoma was not very radiosensitive. Their figures indicate that the results of radiotherapy (including radium application, radon seed implantation, and deep x-ray therapy) as a primary or additional measure, was considered effective in 17% of cases, ineffective in 63%, and uncertain in the remaining cases. McGrath found...
that 50% of patients treated by radiotherapy alone suffered a recurrence. Attention has also been drawn to the possibility that irradiation may lead to sarcomatous transformation in the surrounding bone or in the tumor itself.\textsuperscript{1,3,6,9,14} On the basis of the few studies of spinal osteoclastoma available, there does not seem to be any real difference between the behavior of lesions occurring in the spine and those occurring elsewhere in the body. Nevertheless, in cases of vertebral osteoclastoma, or lesions in other sites where only partial removal can be achieved, x-ray treatment may have to be instituted in spite of the risk and its dubious effectiveness.

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\section*{References}

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