MALIGNANT OSTEOCLASTOMA

Report of a Case

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Ambroise Paré in the sixteenth century probably recognised the condition of osteoclastoma, but the first adequate description was given by Sir Astley Cooper and Benjamin Travers in 1818. Lebert, in 1845, described the characteristic giant cells, but for nearly a century their nature and origin was disputed. Stewart in 1922 stated that they were osteoclasts, a view which has been accepted by most British pathologists, but in the United States this neoplasm is still known by the non-committal name of giant-cell tumour. The two great contributions to our knowledge of this disease were those of Sir James Paget in 1853 and Nélaton in 1860, both of whom considered it essentially benign, as Cooper and Travers held before them; but contemporary opinion refused to accept this and the condition continued to be widely regarded as malignant. In 1862 Virchow agreed that an osteoclastoma was usually benign but stated that it might recur or be malignant; this view is generally accepted to-day but seems to have made little impression at the time. The tumour continued to be called a sarcoma and to be considered malignant, and Gross’s study of seventy cases (1879) in which he insisted that it was benign made little impression. It was not until Bloodgood’s series of papers were published (1910 to 1924) that opinion began to change. His view that the condition was benign became generally accepted; on his suggestion old names such as giant-cell sarcoma and myeloid sarcoma were abandoned and the tumour appeared in the first Registry of Bone Tumours of the American College of Surgeons under the name he suggested, benign giant-cell tumour.

Although an osteoclastoma usually pursues a benign course there is evidence enough that occasionally it can be malignant. A number of cases claimed to be examples of malignant osteoclastoma have now been published, but unfortunately many of them are open to serious criticism. In some cases the nature of the primary growth or of the metastases is uncertain; in others no necropsy was performed and the metastatic deposits were never examined histologically. Some of these cases had a prolonged course, often with repeated attempts at treatment followed by recurrence, and it has been suggested that the malignancy was due to the development of an osteogenic sarcoma and not to any change in the osteoclastoma. In our case the history was short, there was no interference with the primary growth and no recurrence; necropsy was performed and both the primary growth and the metastatic deposits were examined microscopically and found to be characteristic of an osteoclastoma.

CASE REPORT

A Chinese saw-miller, aged thirty-four, was admitted with a large swelling of the right knee which had been present for over a year. It began as a hard, slightly painful, swelling over the medial condyle of the right femur; it was then fusiform, the temperature of the skin was slightly raised and there was egg-shell cracking on pressure. A radiograph showed an osteoclastoma of the lower end of the right femur (Fig. 1). The inguinal glands were not enlarged and there were no signs in the lungs. Disarticulation of right hip was performed. Histological examination confirmed the diagnosis. The wound healed without complications, a tilting-table artificial limb was fitted and the patient was discharged. Twenty-one months
FIG. 1
Figure 1—Radiograph of the osteoclastoma of the right femur.

FIG. 2
Figure 2—Radiograph of the chest, twenty-one months after the patient's discharge.

FIG. 3
Figure 3—Giant-cell tissue of the primary tumour (×106).

FIG. 4
Figure 4—Giant-cell tissue of a pulmonary metastasis (×106).
later he was readmitted with a history of having coughed up half a pint of blood; a radiograph of the chest then showed almost complete opacity of the right hemithorax and patchy opacities in the left lung (Fig. 2). He was discharged after further investigation, but returned two months later and died.

Necropsy—The wound was soundly healed and the lymph glands in the right groin were normal. A soft haemorrhagic growth occupied the greater part of the lower lobe of the left lung, and there were three smaller deposits in the left upper lobe. In the right lung there were large haemorrhagic growths in the middle lobe and the upper part of the lower lobe.

Histology. Primary tumour—The tumour was composed of giant cells of osteoclast type in a cellular stroma (Fig. 3). The giant cells were numerous (more than thirty in a low-power field) and contained many nuclei, in some cases 100 or more. The nuclei were small, oval and regular, or larger and vesicular, resembling exactly the nuclei of the surrounding stroma cells. There was a prominent nucleolus; mitotic figures were not seen. The stroma was composed of irregular cells with oval or spindle-shaped vesicular nuclei, often irregular in shape, and with great variation in size; in general the nuclei were hyperchromatic, though there was some variation in the quantity of chromatin. A few mitotic figures were present. The growth was vascular, and there were numerous haemorrhages. In some areas there was formation of a delicate fibrous tissue, but the stroma cells in general did not form any collagen and the fibrous tissue appeared to be a reaction to haemorrhage or oedema. In other areas there was active absorption of spicules of old bone, and in one area there was formation of new osteoid tissue. Some fat cells were present and there were occasional groups of lipid-laden foam cells. The general appearance was that of an osteoclastoma; only the plump vesicular nuclei of the stromal cells, rather irregular in shape and varying in size and the degree of hyperchromatism, suggested that the neoplasm was not as benign as an osteoclastoma usually is.

Metastatic deposits—The deposits in the lungs showed gross destruction of tissue with necrosis and haemorrhage. One small deposit immediately beneath the pleura was not so damaged and showed a similar appearance to the primary growth (Fig. 4). There were many large giant cells of the osteoclastic type, as in the primary growth. The nuclei of these cells were oval and vesicular and contained a prominent nucleolus; they were identical in appearance with the nuclei of the surrounding stroma cells. Small giant cells with six to twelve nuclei were more frequent than in the primary growth and appeared to be formed by fusion of the stroma cells. The cytoplasm and nuclei of these cells were identical with those of the larger giant cells. There were no giant cells of malignant type. The stroma cells had oval or spindle-shaped vesicular nuclei, generally without a prominent nucleolus. They varied greatly in size and shape, but were smaller than in the primary growth; all the nuclei were markedly hyperchromatic. The proportion of spindle cells was higher, though in any field cells with round or oval nuclei were also present. A few mitotic figures were found in the stroma cells. There was a fine delicate stroma, but little formation of collagen and no formation of bone or osteoid tissue.

DISCUSSION

The histological appearance of this neoplasm was not precisely that of a benign osteoclastoma, but there was sufficient resemblance to enable it to be recognised as an osteoclastoma. The history was comparatively short and it therefore seems more probable that the growth was malignant from the first than that it was originally a benign tumour which later became malignant. This is supported by the absence of all the usually accepted predisposing causes—there were no repeated attempts at treatment, no recurrences, no radiation therapy and no pathological fracture. Death occurred from pulmonary metastases. These have been found in all the published cases. Frequently the lungs are the only site, but in some cases metastasis has been widespread and deposits have also been found in the skin and subcutaneous tissues, the bones, lymph glands and other tissues, as in the case published by Dyke (1931).
Perhaps much of the controversy to-day on the existence of a malignant osteoclastoma is really a dispute on nomenclature. A malignant osteoclastoma can be called an osteogenic sarcoma; a sarcoma is any malignant tumour derived from the connective tissues, and an osteogenic sarcoma is a malignant tumour derived from the specialised connective tissue which we call bone. But such a name gives less information than malignant osteoclastoma, and obscures the fact that an osteoclastoma may occasionally become malignant. If it is desired to use the term osteogenic sarcoma for malignant osteoclastoma some qualification is necessary. Stewart in 1922 suggested the name osteoclast sarcoma; it seems a suitable one, but malignant osteoclastoma is equally appropriate and has been in use for a number of years while Stewart's suggested name seems never to have received any general acceptance.

Willis (1948) has stressed that benign and malignant are merely convenient terms to express the probable behaviour of a neoplasm; they do not represent a fundamental biological characteristic. It is therefore surely wrong to suggest that an osteogenic sarcoma may arise in an osteoclastoma as a completely new and different neoplasm. If an osteoclastoma is malignant or becomes so, it remains the same neoplasm and may still show sufficient differentiation towards the formation of osteoclasts to determine its type. The suggestion that an osteogenic sarcoma arises as a second and unconnected neoplasm in the neighbouring non-neoplastic tissue lacks proof, and the published cases do not suggest that it has ever occurred.

SUMMARY

A case is described of malignant osteoclastoma of the lower end of the femur in which death occurred from pulmonary metastases. The history was short and there was no interference with the primary growth, treatment being confined to disarticulation at the hip. Reasons are given for considering this neoplasm a malignant osteoclastoma rather than an osteogenic sarcoma, and the question of nomenclature is discussed.

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REFERENCES