Primary Malignancy, Secondary Malignancy and Semimalignancy of Bone Tumors

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At the last judgement, human beings were divided into benign and malignant Christians. However, it soon became evident that the two-class system was insufficient and it was necessary to introduce a third category. This third group was reserved for Christians who would have a chance of becoming clean in purgatory and entering Paradise later. Experience with the biologic classification of tumors was similar: between the benign and the malignant types there is an intermediate group. In English literature these intermediate bone tumors are called sarcomas of low-grade malignancy. The German language prefers the term semimalignancy. The two terms do not have quite the same meaning, but are overlapping. I shall attempt to explain what the word semimalignancy really means. It was introduced by ZOLLINGER. The semimalignant sarcomas are characterized by local invasive and destructive growth; they have a tendency to recur but do not metastasize. The intervals between recurrences vary from case to case, lasting weeks, months or years. The histologic structure can be well preserved from recurrence to recurrence in spite of the number of recurrences. The tendency to recur cannot be explained either by specific histologic details or by the structure.

The following bone tumors can be qualified as semimalignant: giant-cell tumors, chondromyxoidfibroma, large central and epiexostotic chondromas of the pelvis, and villonodular synovitis. For the parosteal osteosarcoma the term low-grade malignancy is more appropriate.

The largest group of semimalignant tumors are the giant-cell tumors. The term benign giant cell (3) seems outdated to me. Other authors have demonstrated that 10 percent of giant-cell tumors show a local invasive and destructive growth and sometimes metastasize in the lungs (13). This is true especially of giant-cell tumors in the region of the knee joint. The frequency of local recurrence is about 40 to 60 percent. In the case of giant-cell tumors a definite cure very often requires en-bloc resection, and sometimes even amputation. These facts are very well illustrated by the following case:

Case 1. semimalignant giant-cell tumor of the proximal end of the fibula:

B. Lucia, born 1952, complained of swelling and pain in the left knee joint after a fall. The X-rays showed a swelling and polycyclic destruction of the head of the fibula. The tumor was curretted. The histologic slides showed a typical giant-cell tumor with no signs of primary malignancy (mitosis and pleomorphy of the small spindle cells). The following year the giant-cell tumor recurred. One year after treatment the X-ray at check-up examination showed a ballooning of the head of the left fibula including the proximal metaphysis. Only a thin shell of bone surrounded the tumor. The changes shown on the X-rays aroused the suspicion of secondary malignancy, and amputation of the left leg was therefore performed. Seven years after amputation and eight years after...
currettage of the primary tumor the patient was alive and free of local recurrence and metastases. The histologic slide of the recurrence showed the same structure and cellular details as for the primary tumor (Fig. 1).

![Image of histologic slide](image)

**Fig. 1.** Semimalignant giant-cell tumor of the proximal epimetaphysis of the fibula. First recurrence. 250 x. B. Lucia, 16 years (MB 3134/67)

The concept of semimalignant bone tumor has to be distinguished from sarcomatous degeneration of a primarily benign bone tumor or tumor-like lesion. Two remarks are essential:

1. Present-day knowledge of bone tumors and lesions suggests that every benign bone disease can undergo a malignant sarcomatous transformation. The sarcomatous degeneration of Paget's disease was described originally by Paget himself. The literature includes many papers on sarcomatous degeneration of fibrous dysplasia, of aneurysmal bone cysts, of unicameral solitary bone cysts, of chondromas, of chronic osteomyelitis (rare) and finally of metaphyseal bone infarcts.

2. The sarcomatous degeneration of bone tumor and bone disease is enhanced by irradiation. The interval between irradiation and clinical manifestation of sarcomatous degeneration extends to ten years and more. This experience proves that the treatment of bone lesions has to be carefully evaluated, especially in young patients who are still growing. From my personal experience I would like to add that irradiation of the so-called benign giant-cell tumors tends to favor sarcomatous degeneration and should therefore be used only under special circumstances such as inoperability (6).

The following two examples will illustrate the situation:

**Case 2.** L.H. Marthe, born 1928, had a giant-cell tumor of the distal femoral meta-epiphysis at the age of 20 (1948) and twenty years later, after treatment by repeated currettage and irradiation, a malignant transformation of the tumor was observed so that amputation had to be