



Classification of Primary Bone Lesions

2

Piero Picci, Marco Gambarotti, and Alberto Righi

Primary bone tumors are classified on the base of their histological differentiation, as reported in the following table. They are divided into “benign” (with a limited capacity of local recurrence), “intermediate” (locally aggressive: local recurrence, also

in a destructive way; rarely metastasizing: as above also with possible distant metastasis in occasional cases, not predictable on the basis of the morphology), and “malignant,” the latter furtherly divided into low-grade and high-grade malignant.

Classification of primary bone tumors (WHO 2013)

| Histogenesis | Benign | Intermediate (locally aggressive and/or rarely metastasizing) | Malignant [(*) low-grade lesions if not dedifferentiated] |
|---------------------------------|---|---|--|
| Fibrogenic and fibrohistiocytic | Histiocytic fibroma Benign fibrous histiocytoma | Desmoplastic fibroma | Fibrosarcoma |
| Chondrogenic | Osteochondroma Hemimelic epiphyseal dysplasia Enchondroma Periosteal chondroma Osteochondromyxoma Subungual exostosis Bizarre parosteal osteochondromatous proliferation Synovial chondromatosis | Chondromyxoid fibroma Chondrosarcoma grade 1 Chondroblastoma Fibrocartilagenous mesenchymoma | Chondrosarcoma grade 2 Chondrosarcoma grade 3 Dedifferentiated chondrosarcoma Mesenchymal chondrosarcoma Peripheral chondrosarcoma (*) Periosteal chondrosarcoma (*) Clear cell chondrosarcoma (*) |

P. Picci (✉)
Laboratory of Experimental Oncology, IRCCS
Istituto Ortopedico Rizzoli, Bologna, Italy

I.S.G. Italian Sarcoma Group, Bologna, Italy
e-mail: piero.picci@italiansarcomagroup.org

M. Gambarotti · A. Righi
Department of Pathology, IRCCS Istituto
Ortopedico Rizzoli, Bologna, Italy
e-mail: marco.gambarotti@ior.it; alberto.righi@ior.it

| | | | |
|--|--|--|---|
| Histogenesis | Benign | Intermediate (locally aggressive and/or rarely metastasizing) | Malignant [(*) low-grade lesions if not dedifferentiated] |
| Osteogenic | Osteoma Osteoid osteoma | Osteoblastoma | Low-grade central osteosarcoma (*) Conventional osteosarcoma Telangiectatic osteosarcoma Small-cell osteosarcoma Secondary osteosarcoma Parosteal osteosarcoma (*) Periosteal osteosarcoma (*) High-grade surface osteosarcoma |
| Osteoclastic giant cell rich | Giant cell reparative granuloma | Giant cell tumor of bone | Malignancy in giant cell tumor |
| Vascular | Hemangioma Lymphangioma | Epithelioid hemangioma | Epithelioid and other hemangioendothelioma (*) Angiosarcoma |
| Nervous | Schwannoma Neurofibroma | | MPNST |
| Lipogenic | Lipoma | | Liposarcoma |
| Myogenic | Leiomyoma | | Leiomyosarcoma |
| Notochordal | Benign notochordal cell tumor | | Chordoma (*) |
| Hematopoietic neoplasms | | | Primary non-Hodgkin and Hodgkin lymphoma Plasmocytoma of bone/ plasma cell myeloma |
| Tumors of undefined neoplastic nature/ miscellaneous tumors | Simple bone cyst Fibrous dysplasia Osteofibrous dysplasia Chondromesenchymal hamartoma Rosai-Dorfman disease | Aneurysmal bone cyst Langerhans cell histiocytosis Erdheim-Chester disease | Adamantinoma (*) Ewing sarcoma Undifferentiated pleomorphic sarcoma |