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Solid Tumour Section

Review

Bone: Chondroma

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Identity

Note

Chondroma is an uncommon benign tumour which characteristically forms mature cartilage. It is found mostly in the small bones of the hand and/or feet, although it can also occur in long, tubular bones, primarily the humerus, femur and ribs. Occasion-ally, focal areas of mixoid degeneration may result in a mistaken diagnosis of chondrosarcoma.

Classification

Chondromas are classified according to their location:
- enchondroma: within the bone (within the medullary cavity),
- periosteal chondroma: on the surface of the bone,
- soft tissue chondroma in the soft tissue.

Clinics and pathology

Disease

Enchondroma

Note

Enchondroma is usually a solitary benign lesion in intramedullary bone. Usually asymptomatic, it is incidentally discovered as a palpable bony nodule. Rarely, causes soft tissue swelling and pain at the lesion site. Pain can be a sign of pathologic fracture. Both sex are equally affected, and any age group can be involved. It is thought to develop from epiphyseal cartilage rests that subsequently proliferate and slowly enlarge. Approximately 50% of solitary enchondromas are found in the hands, typically in the middle and distal portions of the metacarpals and the proximal portions of the phalanges, 10% in the feet, 20% in the proximal and distal parts of the femur and the proximal part of the humerus.

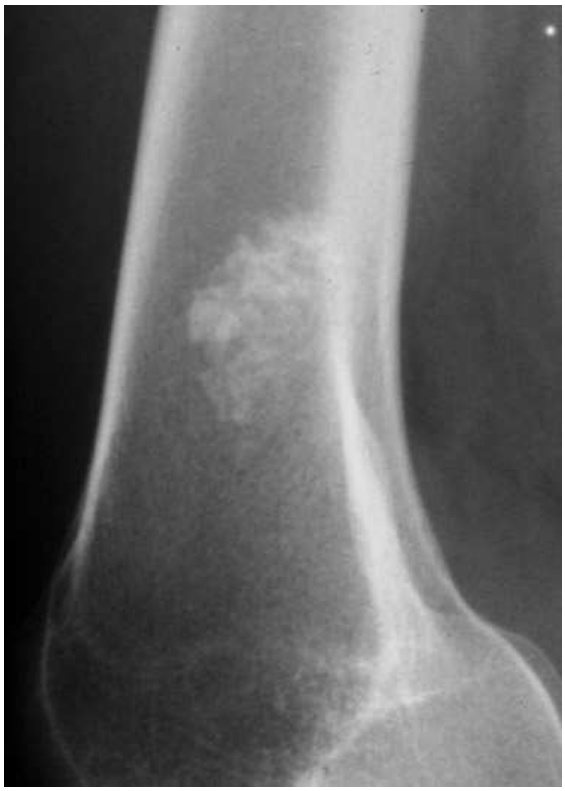


Fig: Enchondroma in the distal portion of the femur shaft. (Courtesy of Dr Henry DeGroot at http://www.drdegroot.com).

On gross examination, the lesion is well circum-scribed and has the pale bluish-gray appearance typical of cartilage.

The nonerheditary syndrome of multiple enchon-dromas or enchondromatosis is known as Ollier's disease. Enchondromatosis associated with soft tissue hemangiomas is known as Maffucci's syndrome.

Pathology

Microscopically, enchondroma is hypocellular with few double-nucleated cells without cytologic atypia, but cellularity may vary. There is no permeation of morrow. The matrix does not show any myxoid change. Calcification and ossification are common. Histologic appearance of enchon-droma may recall that of a grade-1 chondro-sarcoma. The permeation through the cortex into soft tissue must be identified before a diagnosis of chondrosarcoma is made.
The chondromas in Ollier disease and Maffucci syndrome may demonstrate a greater degree of cellularity and cytologic atypia, and may be difficult to distinguish from chondrosarcoma.

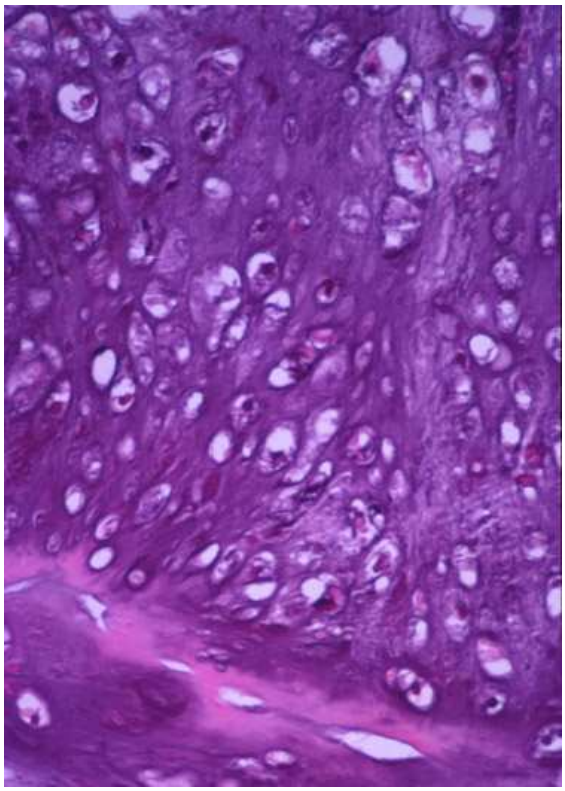


Fig: H&E 20x original magnification of an enchondroma: note lobules of benign cartilage cells and hyaline matrix. (Courtesy of Dr Henry DeGroot at http://www.drdegroot. com).

Treatment

No treatment is required for asymptomatic lesions. If fracture occurs it is usually treated with curretage and bone grafting.

Evolution

A small percentage of enchondromas will undergo malignant transformation, usually throught a slow process, occurring over decades. It is more common in long bones than short.

Prognosis

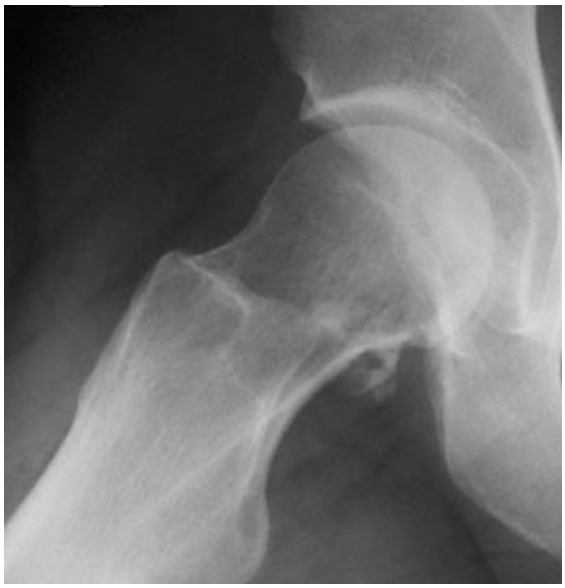
Prognosis for benign enchondroma is excellent.

Solitary lesion in the hand rarely undergoes transformation. It has been suggested that Maffucci's syndrome is associated with a very high incidence of malignancy, either in the skeleton or in visceral organs.

Disease

Periosteal chondroma

Note



a) Fig: Ankle periosteal chondroma; (courtesy of Dr Nick Ordall http://www.xray2000.f9.co.uk/).
b) Fig: Chondroma of the right femur (courtesy of Dr Henry DeGroot at http://www.drdegroot.com/).

Periosteal chondroma is a painful cartilaginous lesion that arises from surface of cortex deep to the periosteum, producing broad based cartilaginous mass that may extend into soft tissues; often develops after adolescence. It does not infiltrate the adjacent soft tissue but may increase in size. It is similar in appearance and location to periosteal osteosarcoma. The potential for confusion with periosteal and parosteal osteosarcoma mandates a thorough investigation and biopsy of this lesion. The most common location is adjacent to the metaphysis. The cortex may be involved to a variable degree, but the lesions do not involve the medullary space.

Pathology

It persists as mass of mature cartilage. Low power microscopy shows well circumscribed lobulated hyaline masses. Cellularity can vary, from hypo- to hyper-cellularity. The cartilage looks more active than enchondroma and the lesion may be confused with chondrosarcoma.

Treatment

Periosteal chondromas are treated with conservative excision.

Prognosis

Risk of recurrence after bloc marginal excision is less than 10%.

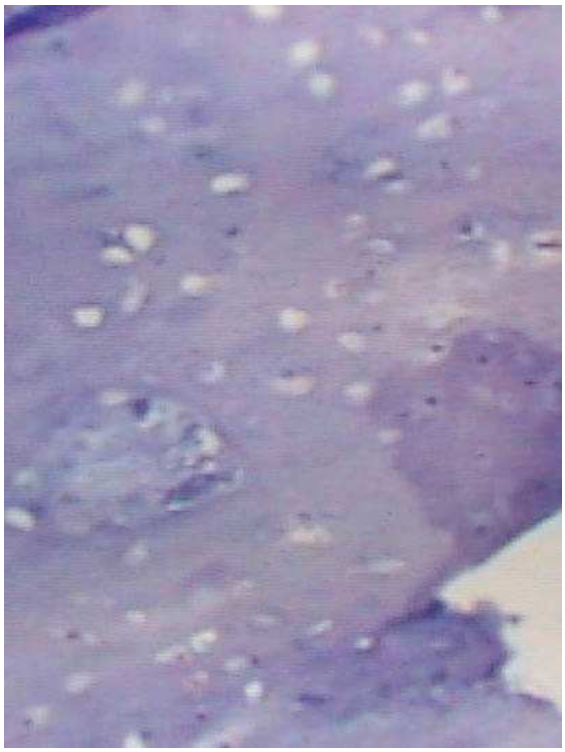


Fig: Bone tumor images (courtesy of Dr Henry DeGroot at http://www.drdegroot.com)

Disease

Soft-tissue chondroma

Note

Soft-tissue chondroma is a benign cartilage-forming tumor, usually arising from tenosynovial sheaths or the soft tissue adjacent to tendons in the hands and feet, usually without any connection to the under-lying bone. Predominantly sited in the fingers, it is usually solitary, develops in adults, and may causes pain. It is composed entirely of mature hyaline cartilage. Infrequently, the tumor undergoes secondary changes and may exhibit morphologic features that result in diagnostic difficulty.

Pathology

Microscopically, soft-tissue chondromas vary considerably in appearence. Most consist of hyaline cartilage arranged in lobular pattern, and may show focal fibrosis, ossification, or myxoid change. Diffuse calcification may occur, completely obscuring the cartilagineous nature of the lesion. In some variants, the cartilage matrix becomes extensively mineralized, often associated with necrosis of chondrocytes, causing the tumor to resemble tumoral calcinosis. Hyaline cartilage may also undergo enchondral ossification, mimicking an osteogenic neoplasm or a reactive lesion. Myxoid degeneration may create confusion with extra-skeletal myxoid chondrosarcoma.

Treatment

Local surgery is the treatment of choice.

Genetics

Note

Cytogenetic studies of chondromas are scarse. A total of 16 cases with abnormal karyotypes have been reported: 6 enchondromas, 4 periosteal chondromas, and 6 soft part chondromas. No consistent abnormality has been detected, although chromosome or chromosomal region 4, 5, 6, 7 and 12q13-15 seems to be nonrandomly involved in changes.

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