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الفريق العلمي

PATHOLOGY

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Introduction
Bone tumors

Tumors Of Bone

*BENIGN tumors :

Tumor type	Tumor site	Age	Appearance & characteristics	Histology
1) Osteoma	skull & Facial bones	40-50y mid age	-Exophytic growths attached to bone surface	resemble normal bone
2) Osteoid osteoma	**Metaphysis** of femur & tibia	10-20y	-**Cortical** Tumor << medulla بتكون بال cartilageاورام ال انه اتزكري >> Localized pain relieved by aspirin	interlacing trabeculae of woven bone
3) Osteoblastom	the vertebra	10-20y		interlacing trabeculae of woven bone

*MALIGNANT tumors :- represent 20% of all primary bone tumors

Tumor type	Tumor site	Age	Appearance & characteristics	Histology < it is same for both >
1) Primary osteosarcoma	**Metaphysis** of : - humerus - distal femur - proximal tibia	10-20y	-Growing outward -lifting **periosteum, & inward to the medullary** cavity.	-malignant mesenchymal cells forming osteoid; cartilage may also be present
2) Secondary osteosarcoma	humerus, pelvis & femur	>40y	-Appear as a complications of polyostotic Paget disease	malignant mesenchymal cells forming osteoid; cartilage may also be present

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Tumors Of Cartilage

*BENIGN tumors :

Tumor type	Tumor site	Age	Appearance & characteristics	Histology
1) Osteo -chondroma (exostosis)	**Metaphysis** of long tubular bones	10-30y	- Bony excrescences (outgrowth نعني) - cartilage-capped outgrowths **at epiphyseal growth plates** - may be solitary, or, multiple - hereditary	
2) Enchondroma	Small bones of hands & feet	30-50y	- Well-circumscribed single tumor - arise within bone **medullary cavity** - usually>> single BUT uncommonly>> multiple - hereditary	resembling normal cartilage

*MALIGNANT tumors :-

Tumor type	Tumor site	Age	Appearance & characteristics	Histology
Chondrosarcoma	- shoulder - ribs - pelvis - proximal femur	40-60y	- Arise within **medullary cavity & erode cortex**	Either well differentiated cartilage-like { OR anaplastic malignant mesenchymal T forming cartilage

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Miscellaneous Tumors

*BENIGN tumors :

Tumor type	Tumor site	Age	Appearance & characteristics	Histology
Giant-cell Tumor (usually benign)	**Epiphysis** of long bone *هاد الوحيد يلي بصير بال epiphysis	20-40y	- Lytic lesions that erode **cortex** - majority are benign (but 4%, or more, are malignant).	osteoclast-like giant cells + round or spindle-shaped mononuclear cells

*MALIGNANT tumors :-

Tumor type	Tumor site	Age	Appearance & characteristics	Histology
Ewing Sarcoma	**Diaphysis & metaphysis**	10-20y	Arise in **medullary cavity**	sheets of small round cells that contain glycogen. (blue in colour)

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*GENERAL PRINCIPES :

1) Primary bone tumors exhibit great morphologic diversity & clinical behaviors, ranging from benign to highly malignant, rapidly fatal cancers.
2) Most tumors are classified according to : - the normal cell of origin
   - the pattern of differentiation
   excluding multiple myeloma & other hematopoietic tumors
3) *BEFORE AGE 40 Benign tumors of bone are much more common.
   *AT ELDERLY AGE Malignant tumors of bone are much more common. Overall, matrix-producing & fibrous T **are the most common**
4) **The most frequent benign tumors are :** 1) osteochondroma 
   2) fibrous cortical defects {composed of cytologically benign fibroblasts}
5) **The most common primary malignant bone tumor** is osteosarcoma, followed by chondrosarcoma & Ewing sarcoma.
6) **Primary malignant bone tumors are less common** than secondaries (that come from other primary cancer sites)
   Bone is the 3rd commonest site of secodary malignant tumors after the lungs & the liver.
   ~.~ FROM MOST to LEAST common site : 1) lungs >> 2) liver >> 3) bones
7) **Most bone tumors develop during the first several decades of life** & have a propensity (tendency) to originate in the long bones of the extremities
8) **Osteosarcomas** occur during adolescence, with half arising around the knee (either in the distal femur or proximal tibia)
   BUT
   Chondrosarcomas occur during mid- to late adulthood & involve the trunk , limb girdles , proximal long bones.
9) **Fibrous dysplasias** : is failure of normal bone elements to differentiate into mature structures
10) **Causes of bone tumers :** most of them arise without any cause BUT **osteosarcoma is associated with**
    - Genetic syndromes (retinoblastoma & LiFraumeni syndromes)
    - (**rarely**) : bone infarcts , chronic OM , Paget disease , radiation , metal orthopedic devices.
11) **Clinically benign bone tumors are :** asymptomatic & detected by incident / Others produce pain or a **slowly** growing mass / **sudden pathologic fracture is the first manifestation.**
    it is a fracture in an abnormally weakened bone by tumor, inflammation, cyst, osteoporosis etc
12) **Radiologic imaging is critical** in bone T evaluation
    Biopsy & histopathologic study are essential (Mandatory) for the final bone T diagnosis
    Final diagnosis rests on combination of: (I) clinical presentation (age, gender, & symptoms)
    (II) tumor site
    (III) radiologic appearance
    (IV) gross surgical
    (V) histologic features

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*BONE FORMING TUMERS :

NOTE : All the T cells in the following neoplasms produce bone that is usually **woven & variably mineralized**.