MSS

PATHOLOGY

#6

WRITER:
Rama Harb

CORRECTOR:
Ahmad Allaham

DOCTOR: Mousa Al-abbadi

We talked in the previous lectures about tumors, if you remember the table that I'm sure you have memorized it ;), we talked about tumors with unknown cell of origin.

Well, we will continue with these tumors.

Gaint cell tumor of bone(GCT)

- Locally aggressive neoplasm of adults. It destroys vertebral bodies.
- It is located in Epiphyses of long bones.

It is called osteoclastoma as the cells that are found in histological section are multi-nucleated giant cells like osteoclasts.

Many tumors of the bone have a multi-nucleated giant cells as a reaction.

But in giant cell tumor of bone all the tumor is giant cell tumor, from wall to wall you will see multi-nucleated giant cells.

- Osteoclast-like giant cells
- potentially malignant,90-95% it behaves as a benign tumor,Rare malignant behavior
- Cells contain high levels of RANKL

remember that RANKL controls osteoclasts' differentiation and maturation.

-Trx: curetting,treatment if there are symptoms such as pathological fractures and pain.

Giant cell tumors often destroy the overlying cortex, producing a bulging soft tissue mass delineated by a thin shell of reactive bone (Fig. 21.25). Grossly, they are red-brown masses that frequently undergo cystic degeneration. Microscopically, the tumor conspicuously lacks bone or cartilage, consisting of numerous osteoclast-type giant cells with 100 or more nuclei with uniform, oval mononuclear tumor cells in between (Fig. 21.26).

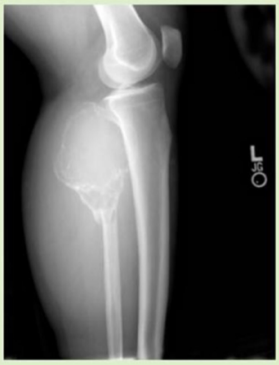


FIG. 21.25 Radiographically, giant cell tumor of the proximal fibula is predomi...

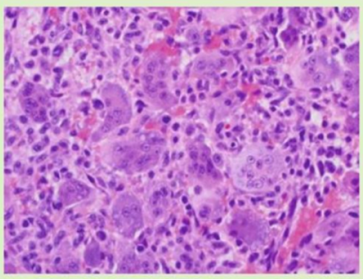


FIG. 21.26 Giant cell tumor illustrating an abundance of multinucleated giant c...

Here in histological section you will see mononuclear cells and multi-nucleated giant cells.
Wall to wall giant cells

ANEURYSMAL BONE CYST:

An aneurysm is an abnormal bluge or ballooning in the wall of the blood vessel.

It has a beautiful name as what Dr. said because it describes its feature.

It is a cyst inside the bone filled with blood like the aneurysms of arteries.

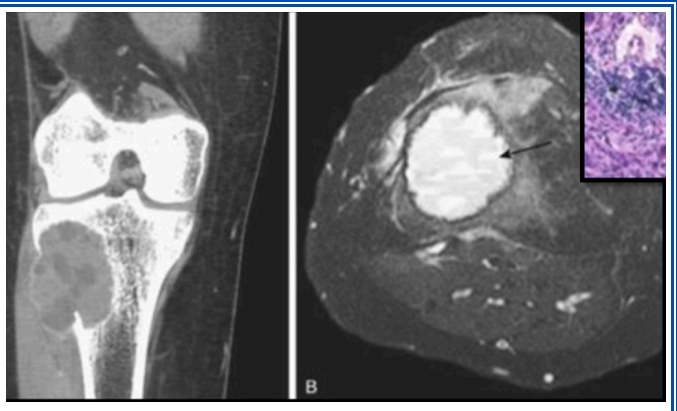
So it is a cystic structure characterized by blood inside of it, also you may see a multi-nucleated giant cells but that doesn't make it a giant tumor of cells.

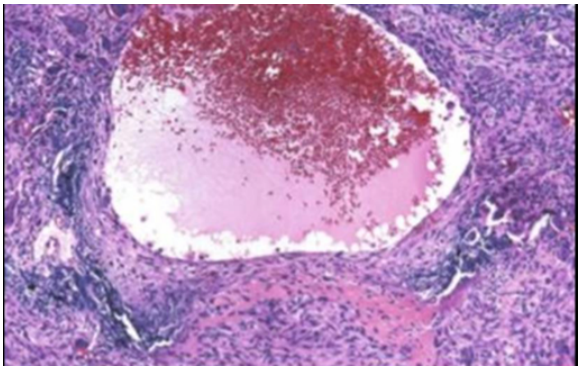
-Benign tumor.

-Blood filled cyst.

-Metaphysis of long bones; adults. It happens older/large adults NOT children.

It is will circumscribed in the metaphysis of bone,in the following picture this is the tibia and you can see that it is benign as there is(no signs malignancy),no codman triangle filteration or destruction.





NONOSSIFYING FIBROMA:

الدكتور قلنا سر، إنه هو ما بيحبّها، بس انتو ما عليكم مخبى يعني🤭🫶

It is a fibroma and doesn't have an ossification.

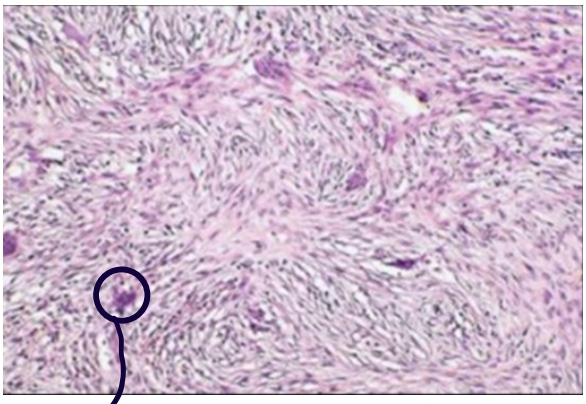
-Benign lesion, maybe reactive not a true neoplasm;it is something like trauma, infection or virus. (other names: FCD:fibrous cortical defect, MFD:metaphyseal fibrous defect)

It is a neoplastic process or a reactive process. However, it presents as a mass lesion and that's why we put it under tumor category.

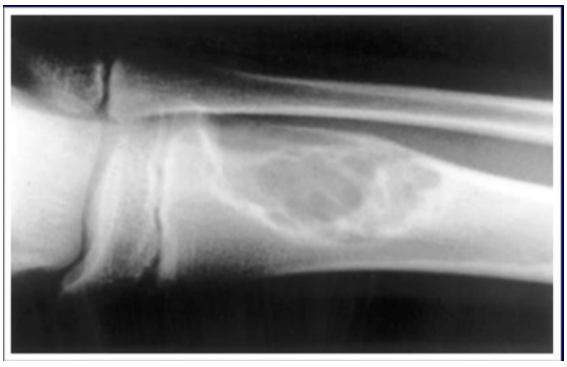
-located in Metaphysis.

-Histology:bland(normal, not ugly it means Benign)fibroblastic proliferation.you will see osteoclasts reactive giant cells,they are found in all tumors!

However, keep in your mind that doesn't mean that it is a giant cells tumor.However if the tumor is filled from wall to wall with giant cells it is a giant cell tumor.



-May resolve spontaneously



FIBROUS DYSPLASIA (FD):

When you see “DYSPLASIA” you should know its location as dysplasia whether in the cervix, uterus which is different from dysplasia in the brain, and both of which are different from congenital bone diseases.

Not a real tumor; rather a developmental abnormality of bone genesis due to mutations in GNAS1 gene (cAMP mediated osteoblast differentiation).

There is something wrong happened during osteoblast differentiation and maturation, that will affect the mediator cAMP.

• multiple Forms of (FD):

– Monostotic: affecting one bone

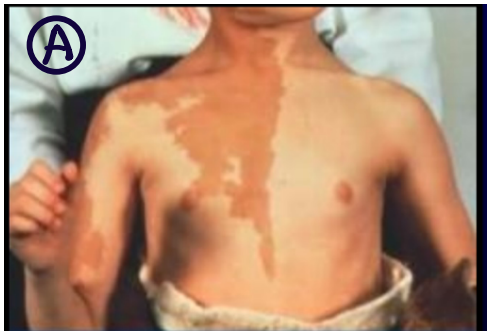
– Polystotic: multiple bones

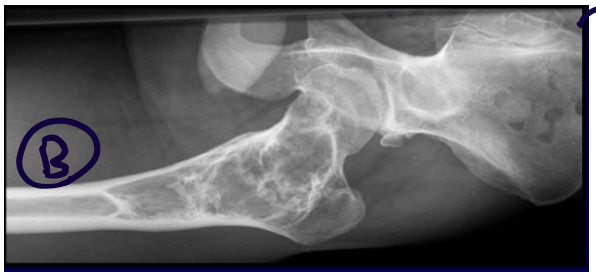
– Mazabraud syndrome: FD(fibrous dysplasia)+ soft tissue myxoma(benign tumor of the myxoid cells)

– McCune-Albright syndrome(important): polystotic FD (note pic B)multiple growth and abnormalities in bones(jew, pelvic, femur)+ café- au-lait skin pigmentation (note pic A)brown lesions in the body+ endocrine abnormalities(hyperthyroidism,..) (precocious puberty)

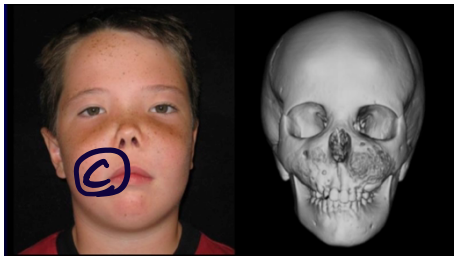
Precocious puberty:early puberty and development(exhibiting mature qualities at an unusually early age)due to hormones.

Characterized in males by hair growth on face, axilla and so on.while characterized in females by well developed breast, growth of pubic and maxillary hair.

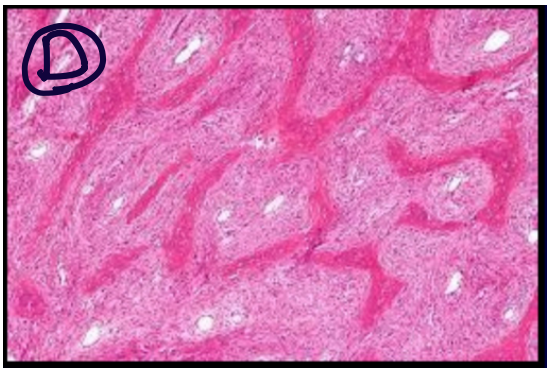




Abnormal bone. The intensity of coloration differs.



Common locations:face and jaws



Abnormal bone formation and abnormal marrow.

We call them **Chinese letters.**

METASTATIC TUMORS TO BONE:

-after age 60-65 it is Much more common than primary bone tumors.

-In adults:any tumor can go to the bone.However, cacinoma is on the top of the list.most are carcinomas; lung, prostate, breast(mostly in females), kidney, thyroid & **liver:**If you didn't find the primary tumor, you should think about liver.

Hepatocellular carcinoma is fatal, very aggressive, doesn't have a proper treatment chemotherapy.

Recently, there are some stains discovered, TTF1(thyroid transcription factor1) which is an organ specific marker in lung and thyroid. In hepatocellular carcinoma it stains the cytoplasm(while it stains membranes in the lung and thyroid).

-In children: Neuroblastoma, Wilms tumor (these the top two most common causes of abdominal masses in children(under 6 years)and rhabdomyosarcoma(sarcoma of the skeletal muscles)

-Usually multiple and axial(vertebral bodies, pelvic..) and any bone can be affected; mostly hematogenous spread.

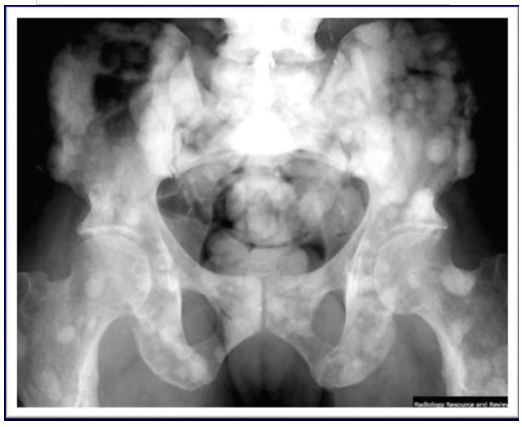
-Lytic(resorbs the bone), blastic(forming bones) or mixed (via mediators and secretions).

Lytic lesions, more common than blastic lesions.

When you see blastic in males you think about primary prostate(most common).

The best way to determine and diagnose prostate in males is serum prostate specific antigen **PSA.**

Blastic metastasis



Abnormal pelvis with multiple osteoblastic lesions.

Metastatic prostate cancer.

The best way here is doing PSA.

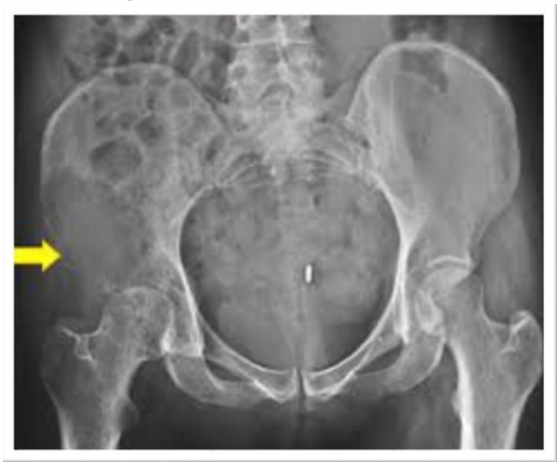
Note:

PSA<4 the best

PSA>4 there is a chance of having prostate cancer. بس بتخوفش

PSA>10 cancer

Lytic metastasis



Female with pelvic masses you should examine the breast.

SUMMARY

BONE TUMORS AND TUMORLIKE LESIONS

Primary bone tumors are classified according to the cell of origin or the matrix that they produce. The remainder is grouped according to clinicopathologic features. Most primary bone tumors are benign. Metastases, especially from lung, prostate, kidneys, and breast, are far more common than primary bone neoplasms.

Major categories of primary bone tumors include

- **Bone forming:** Osteoblastoma and osteoid osteoma consist of benign osteoblasts that synthesize osteoid. Osteosarcoma is an aggressive tumor of malignant osteoblasts, predominantly occurring in adolescents.
- **Cartilage forming:** Osteochondroma is an exostosis with a cartilage cap. Sporadic and syndromic forms arise from mutations in the *EXT* genes. Chondromas are benign tumors producing hyaline cartilage, usually arising in the digits. Chondrosarcomas are malignant tumors of chondroid cells that involve the axial skeleton in adults.
- **Ewing sarcomas** are aggressive, malignant, small round cell tumors most often associated with t(11;22).
- **Fibrous dysplasia** is an example of a disorder caused by gain-of-function mutations that occur during development.

JOINTS (BASIC KNOWLEDGE):

The doctor said that this slide is for self-reading

-Provide motion & stability to our skeleton

-Synovial (cavitated): synovial joints, wide motion (knee, elbow...)

-Non synovial (solid): synarthrosis, minimal movement (skull, sternum...)

-Synovial joints covered by hyaline cartilage (70% water, 10% type II collagen, 8% proteoglycans + chondrocytes

-Synovial membrane contains: A synoviocytes (diff. macrophages), and B synoviocytes fibroblast-like

-Synov membrane lacks basement membrane

-Hyaline cartilage: no blood supply, no nerves, no lymphatics(shock absorber)

OSTEOARTHRITIS (DJD):

Its proper name is degenerative joint disease

-Degeneration of cartilage, not true – ITIS

-Primary or idiopathic: aging process all people will have degeneration of joint as they get older; few joints such as:knee,ankles.

-Secondary: due to pre-existing diseases less common.

-Insidious; increase with age (>50 yr); 40% of people > 70 years are affected

-Degeneration of cartilage >> repair and proliferation.

It is a joint cartilage disease not in bone and not in ligaments that surround them, and it is NOT true inflammatory ITIS.

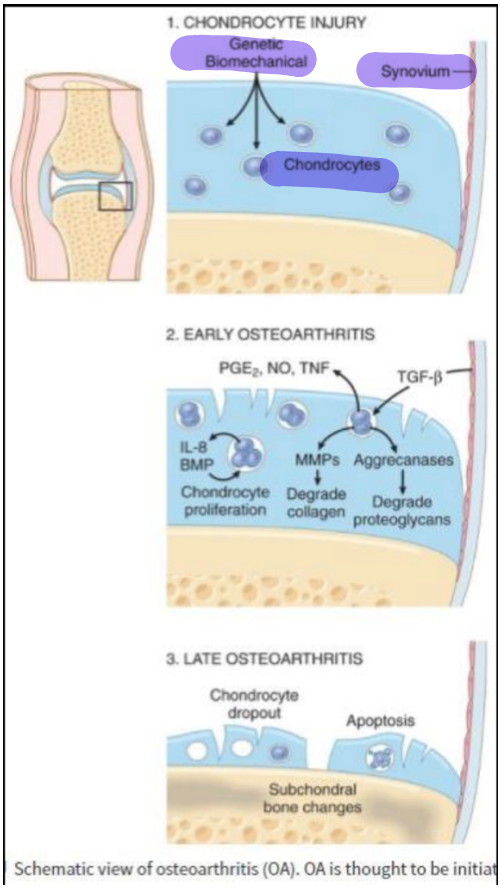
Multiple reactions happen in cartilage as well as it contains multiple tumor mediators that make injury and repair.

Then chondrocytes themselves will have some erosion through enzymes that degrades the collagen.

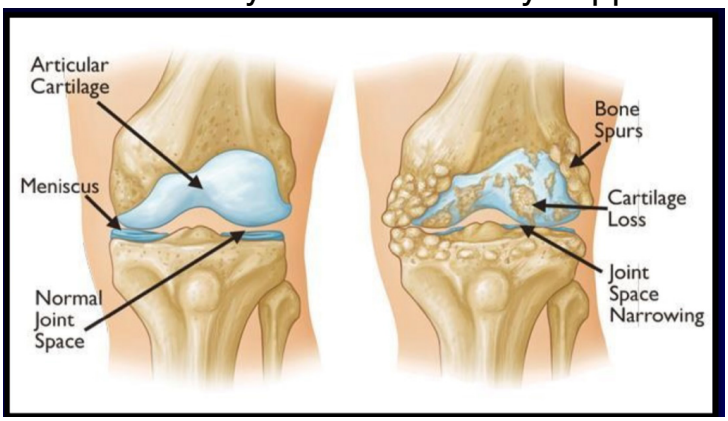
After that, **eburnation(تعرّي)**of the cartilage will take place, then changes underneath the cartilage (at bones) that will affect the bone.

The changes on bones in osteoarthritis are due to abnormalities/degeneration in the overlying cartilage.

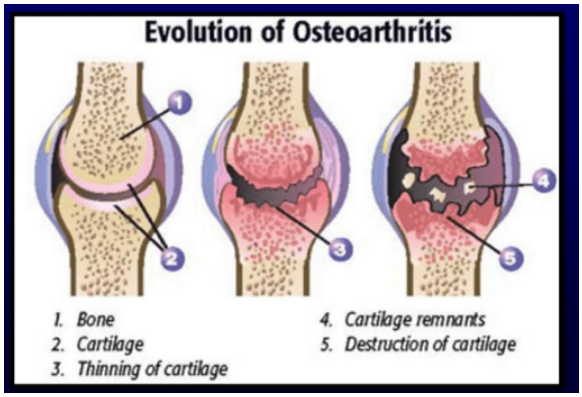
Subchondral cyst formation may happen also.



Schematic view of osteoarthritis (OA). OA is thought to be initiat

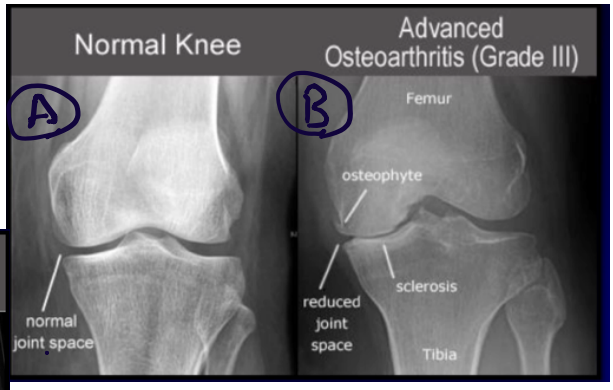


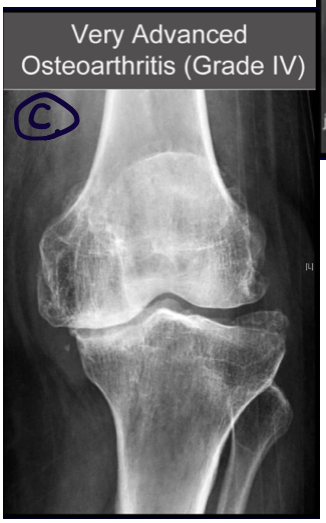
When the underlynig bone affected, some pieces of bone will leave it and go to the cartilage, we call these pieces **bone spurs.**



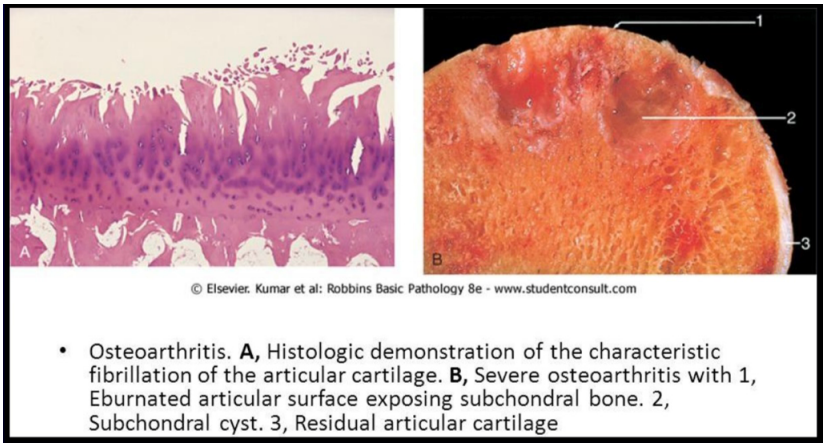
(A) represents normal knee joint.
The space between femur and tibia is normal, and there is no abnormalities in the bone.

(C) represents sever forms.
The bone is reactive, there is sunchondral cyst formation, narrow joint space.





Histologically, the cartilage is مشرشب and there is sclerosis in underlying bone.
Please, read what is written under the adjacent photo.



© Elsevier. Kumar et al: Robbins Basic Pathology 8e - www.studentconsult.com

- Osteoarthritis. **A,** Histologic demonstration of the characteristic fibrillation of the articular cartilage. **B,** Severe osteoarthritis with 1, Eburnated articular surface exposing subchondral bone. 2, Subchondral cyst. 3, Residual articular cartilage

OA (DJD) CLINICALLY:

-Joint pain OA pain increases with movement.worsens with use, morning stiffness, crepitus & range limitation, radicular pain, osteophytes impingement on vertebrae, muscle spasm & atrophy
-No magic preventive strategies (wt loss?—loosing wight)
-Trx: pain control, decrease inflammation (NSAIDs), intra-articular steroids (injection inside joints), or joint replacement for severe cases.
-Large health cost on countries.

"عِش ضَاحِكاً مَهمَا شَقِيت؛ إنَّ
الجُروحَ بصَوتِ الضَّحِكِ تَلتَئِمُ."

V1

Page7.

Changes that happen in bone are due to degeneration of the overlying cartilage NOT regeneration.

V2

Page1,

GCT destroys vertebral bodies.

هالمعلومة انذكرت بسكشن ١ بس، ما بتتعارض مع الموضوع

بس المعلومة مش مفصلية، الأهم نكون عارفين إنه:

GCT located in epiphyses of long bones.