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(وَفَوْقَ كُلِّ ذِي عِلْمٍ عَلِيمٌ)

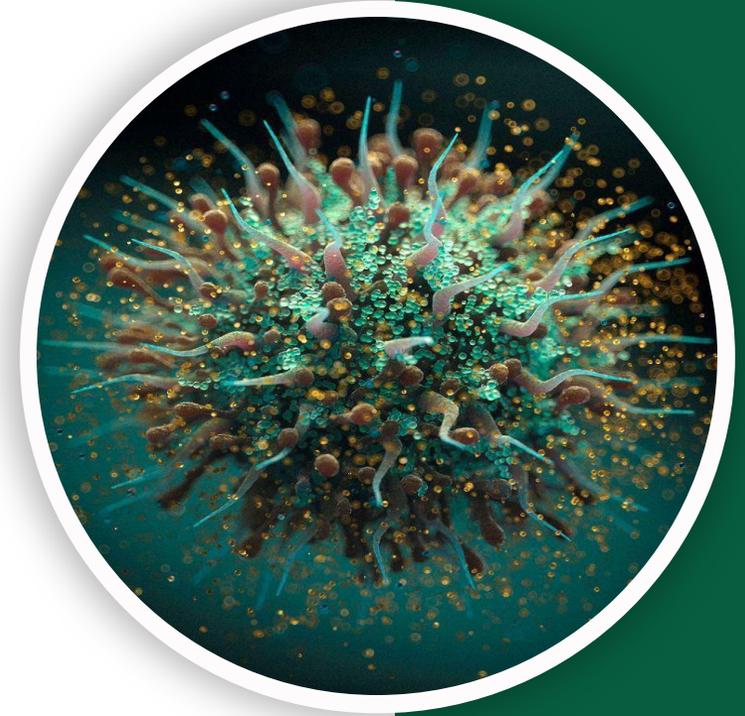


جريدة

MSS Pathology | FINAL 6

# Case Discussion

## MSS 2



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**CASE DISCUSSIONS**  
**MSS (CASES 4-7)**  
**2026 Al-Abbadi**  
**University of Jordan**  
**School of Medicine**

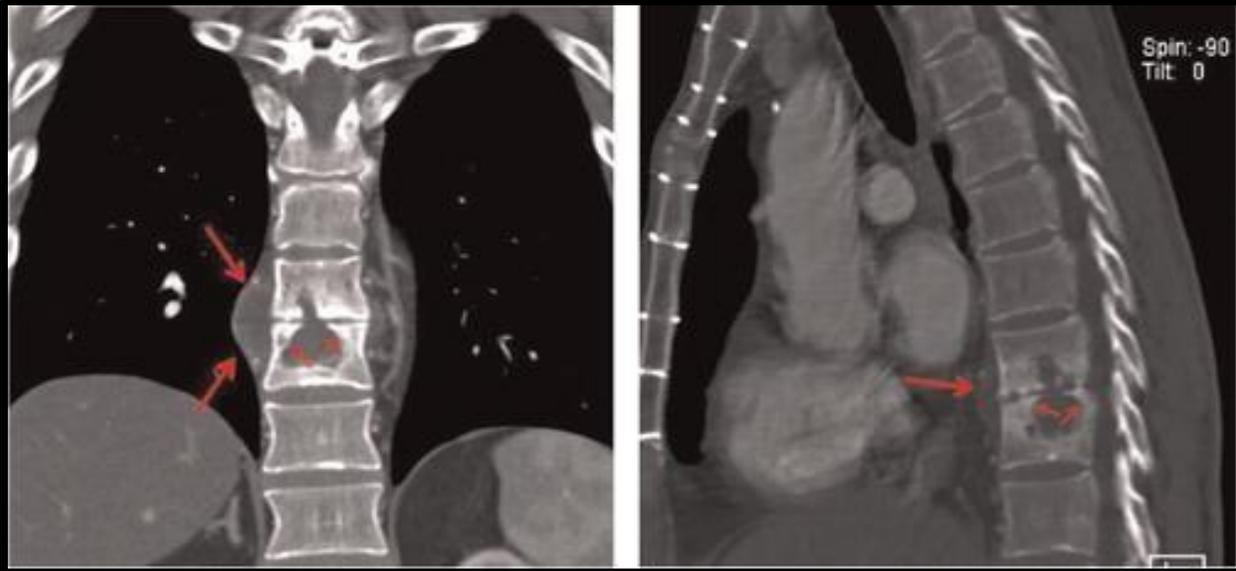
# CASE 4

- A 28-year-old man presents with 3 months of back pain, low-grade fever, night sweats, and weight loss. Examination shows localized tenderness over the lower thoracic spine and mild kyphosis. ESR is elevated. MRI spine shows destruction of T9–T10 vertebral bodies with paravertebral abscess formation. FNA done.

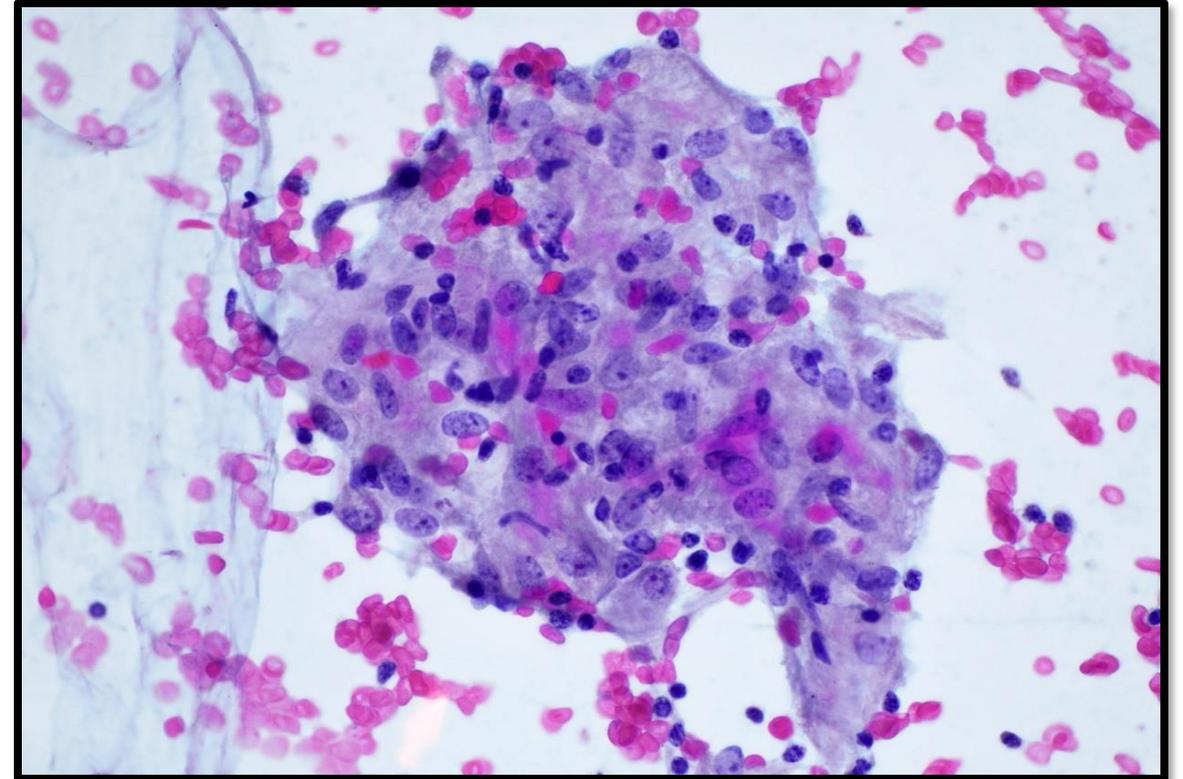
# MRI & FNA SMEAR:

Anteroposterior view

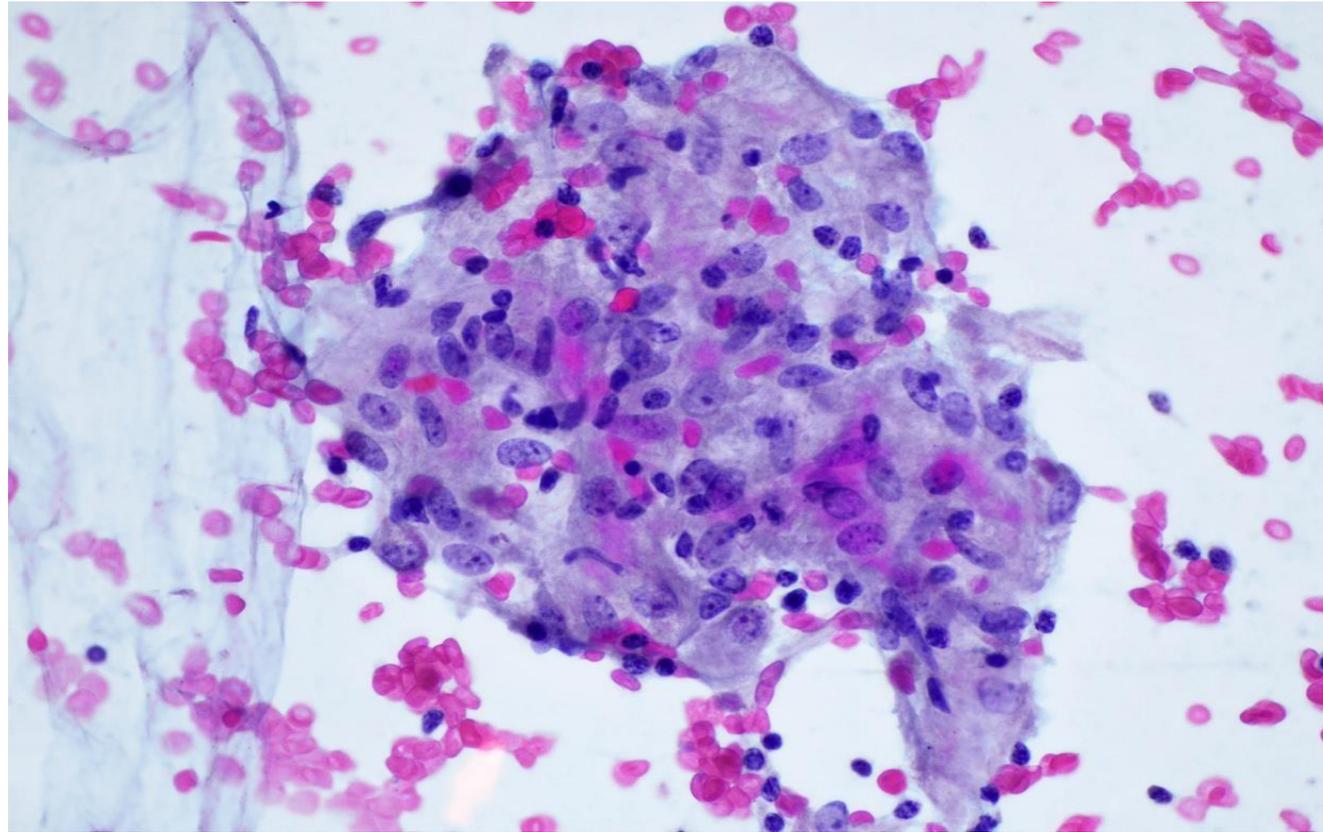
Lateral view



- The arrows here point to an osteolytic region/destruction
- All vertebrae are normal except the ones pointed with to with red arrows (T9-T10)
- To get this we performed a fine needle aspiration NOT biopsy and we got this high-power view image.



Details of this image on next slide



- In the image you can see structures stained purple and pink .The structures stained pink are red blood cells. And purple are epithelioid histiocytes with some inflammatory cells forming a ball shaped structure of epithelioid histiocytes , eosinophils , plasma cells , lymphocytes, this is called **granuloma** ; So this is **granulomatous inflammation in the spine**

## Discussion points:

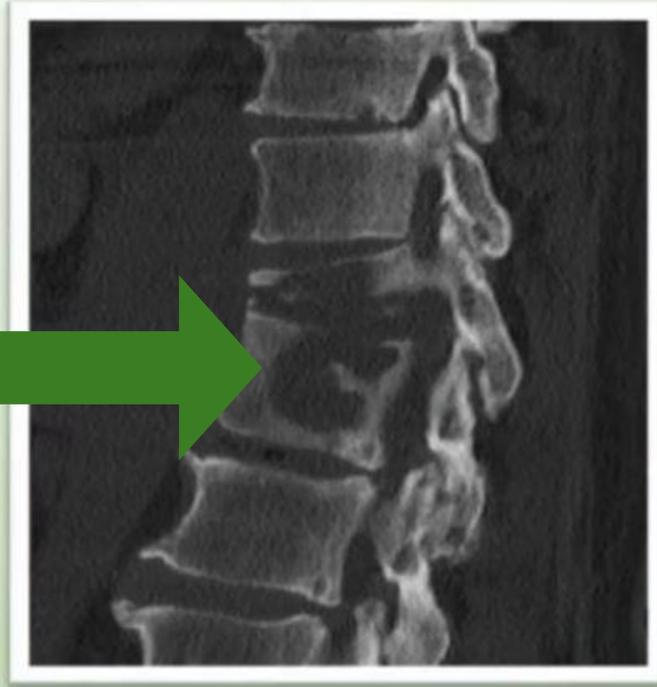
- **Q1. What is the most likely diagnosis?**
- **Q2. What is the most common route of spread to the spine?**
- **Q3. Which spinal region is most commonly affected?**
- **Q4. What is the characteristic imaging finding?**
- **Q5. What is the mainstay of treatment?**

Given the symptoms fever, pain, weight loss, night sweat and the fact that the patient is 28-year-old meaning he's young, all these factors lead to having a paravertebral abscess due to **chronic specific infection**

**Q1. What is the most likely diagnosis?**

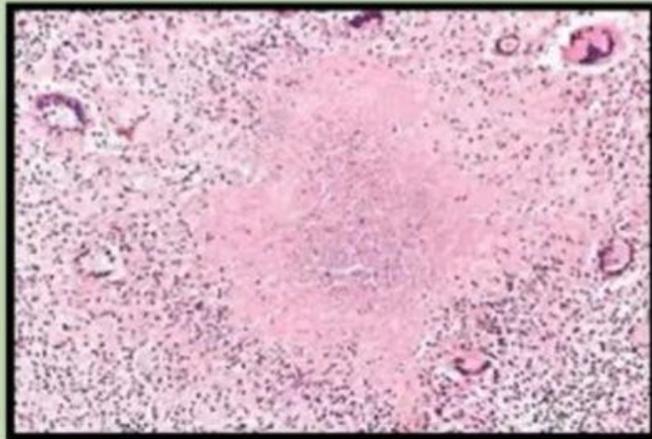
Pattern: Having a granuloma in the vertebral body which has done destruction,  
It is not a tumor because there is a granuloma and infection,  
So it is **chronic specific infection (pott disease)**

This is a collapsing fracture of lesion



This is a classic example of Pott disease (systemic symptoms & destruction) and here we confirmed it by further investigation using specific stains

Granuloma with central necrosis



This is the organism causing this infection Using TB Ziehl-Neelsen stain or acid-fast stain

**ANSWER:**

**Pott disease  
(tuberculous  
spondylitis)**

**Q2. What is the most common route of spread to the spine?**

**ANSWER:**

**Hematogenous spread from  
primary pulmonary TB**

Because TB is most involved with the lymph nodes of the **lungs** they leave through blood and reach the spine easily because it's near

**Q3. Which spinal region  
is most commonly  
affected?**

**ANSWER:**

**Thoracic spine (most common), followed by lumbar spine**

**TB can occur anywhere, but when it infects the spine it's called pott disease.**

**Q4. What is the characteristic imaging finding?**

# ANSWER:

All these are key features of pott disease , Especially the **cold abscess (painless abscess)**

- **Vertebral body destruction**
- **Disc space narrowing (late)**
- **Paravertebral “cold” abscess**
- **Gibbus deformity in advanced disease**

Gibbus deformity is a severe deformity/kyphosis happening in multiple vertebrae destruction due to TB spondylitis



**Q5. What is the  
mainstay of  
treatment?**

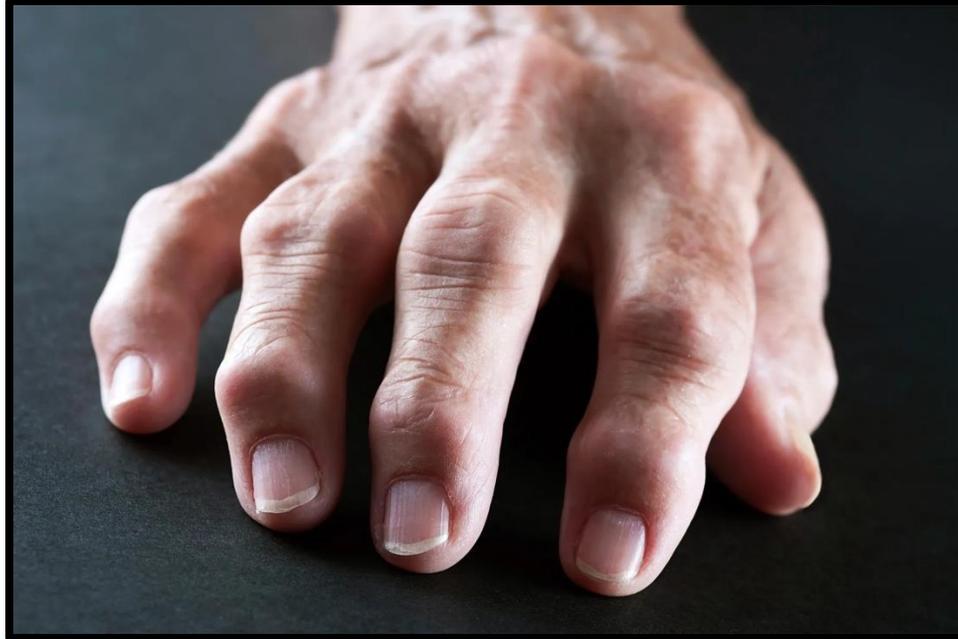
**ANSWER:** Combination therapy is given for long periods (3-6months)

- 1. Anti-tuberculous therapy (RIPE regimen initially)**
- 2. Surgery if neurological deficit or spinal instability**

# CASE 5

**A 42-year-old woman presents with morning stiffness lasting >1 hour and symmetric pain in MCP and PIP joints for 6 months. Exam shows joint swelling and tenderness. Labs show positive RF and anti-CCP antibodies. X-ray shows periarticular osteopenia and marginal erosions.**

- The diagnosis here is rheumatoid arthritis, the key clues are signs of inflammation; joint swelling & tenderness, small bones of the hands & symmetric pain.
- RF is more **sensitive**, Anti-CCP is more **specific** hence, it's rare to see someone with Anti-CCP without Rheumatoid Arthritis.



**This is classic ulnar deviation  
You can also see the joints swelling & tenderness**

# **DISCUSSION POINTS:**

**Q1. What is the pathologic hallmark lesion in RA?**

**Q2. Which antibodies are most specific for RA?**

**Q3. What cytokine plays a major role in RA pathogenesis and is targeted by biologics?**

**Q4. What is the most common extra-articular manifestation?**

**Q5. What is first-line disease-modifying therapy?**

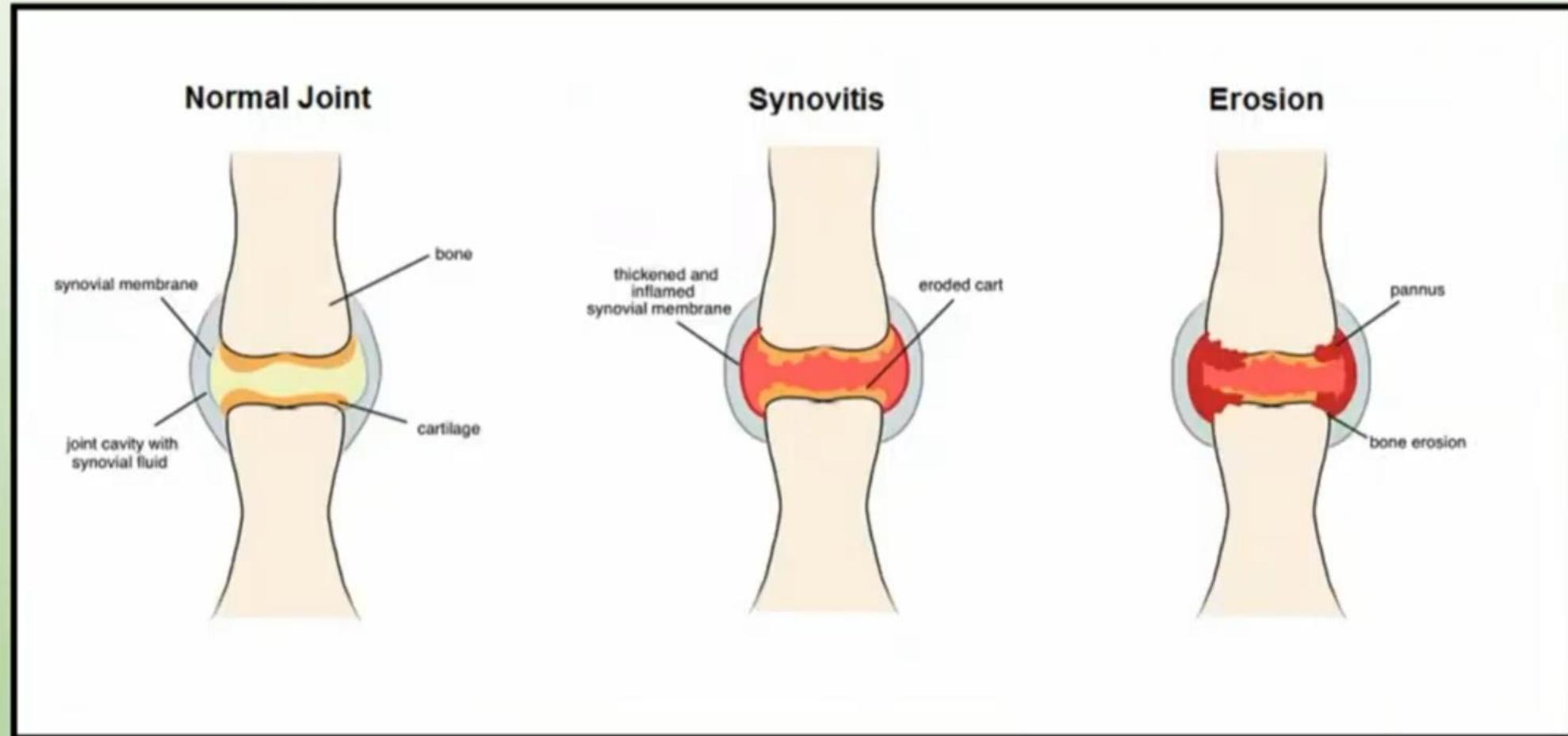
**Q1. What is the  
pathologic hallmark  
lesion in RA?**

**ANSWER:**

**Pannus formation  
(inflamed granulation  
tissue destroying  
cartilage and bone)**

Pannus is chronic **proliferative** non-suppurative synovitis, it is not an abscess.

This image shows normal joint undergoing synovial inflammation & gets bigger forming pannus, where proliferation of the synovium occurs with inflammatory cells & sometimes granulomas



**Consequently, it leads to secondary erosion of cartilage and bone ; however, the primary target of rheumatoid arthritis is the synovium**

**Q2. Which antibodies are most specific for RA?**

**Answer:**

**ANSWERS:**

# Anti-CCP Antibodies

- **There is a difference between sensitivity and specificity.**
- **RF is a sensitive test used for screening, but it may yield false-positive due to its lower specificity compared to anti-CCP antibodies . Anti-CCP is more specific and is used to confirm the diagnosis.**

**Q3. What cytokine plays a major role in RA pathogenesis and is targeted by biological agents?**

**ANSWER:**

**TNF-alpha (also IL-6)**

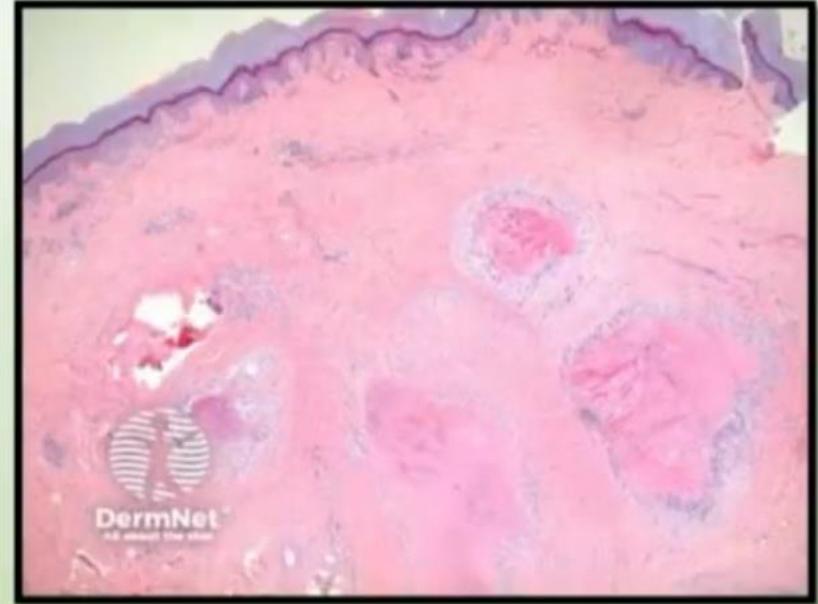
**There are multiple mediators such as IL-17 or IL-6 but TNF-a is most important and most active and it's the one targeted for treatment of RA**

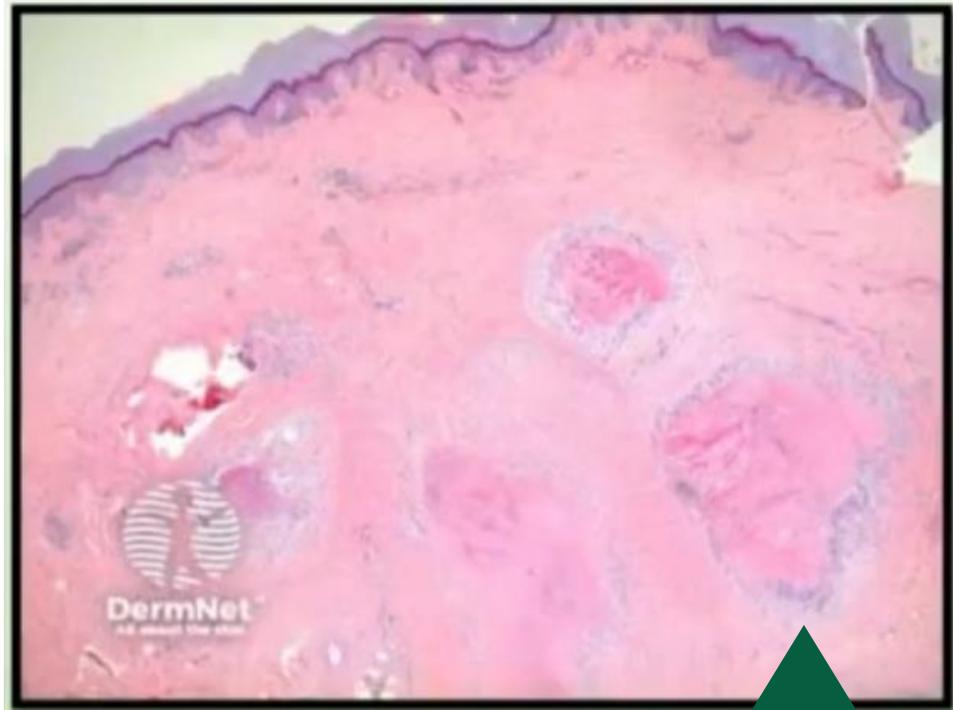
**Q4. Q4. What is the most common extra-articular manifestation?**

**ANSWER:**

# Rheumatoid nodules

Rheumatoid arthritis is an auto-immune, systemic disease, although the main target is the synovial joints, there is no organ that can't be affected by Rheumatoid arthritis. Among those extra-articular spots, it is the skin





When sectioning is done the following image is seen. We can see the skin layers Epidermis, dermis, deep dermis And also, **granulomas** or "**rheumatoid nodules**" are seen which are pointed at by the arrow. They are granulomas containing central necrosis. It is not TB instead they're rheumatoid nodules due to RA; This is skin manifestation due to rheumatoid arthritis When such case comes to the clinic all tests are done including TB & fungus, because the patient might be immunosuppressed by the medications & now has super-added tuberculous infection

**Q5. What is first-line  
disease-modifying  
therapy?**

**ANSWER:**

# Methotrexate

- It is an active disease that we need to aggressively treat it.
- Methotrexate is drug of choice for RA
- It is anti-inflammatory immunosuppressive drug

# Teaching Pearl:

Remember these key features, & that the target is the synovium

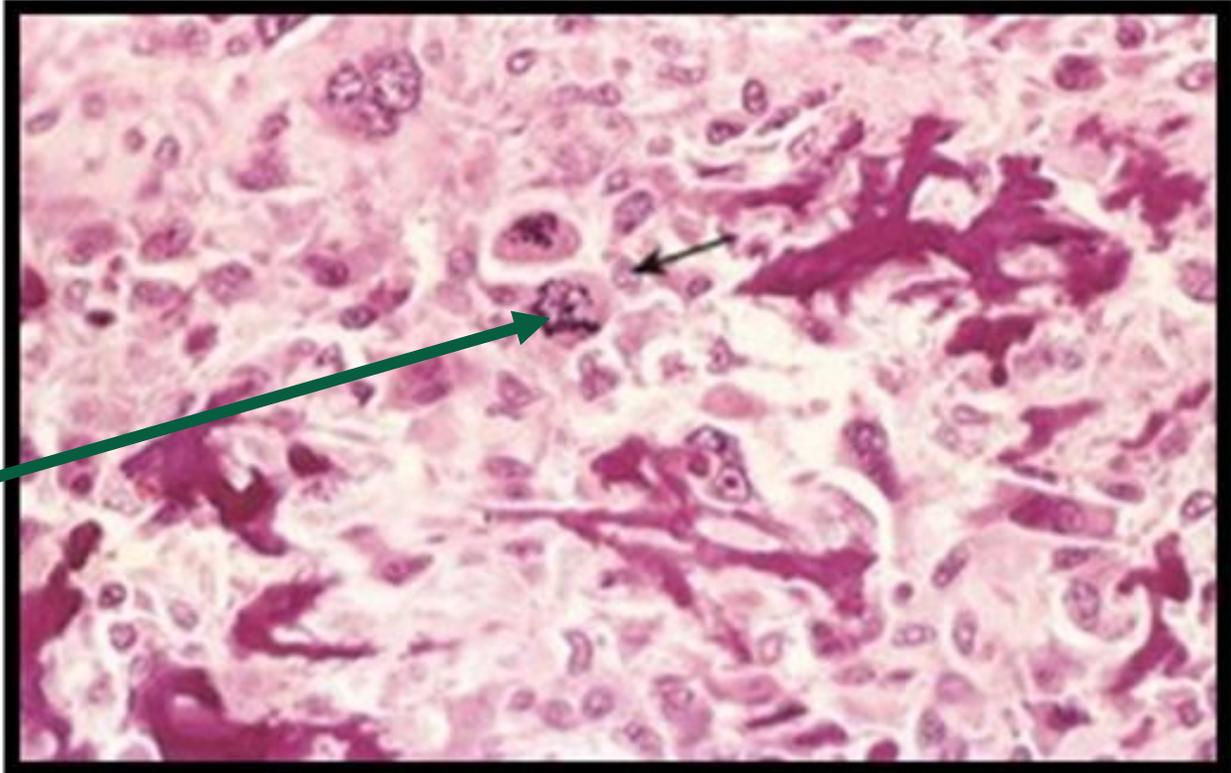
**RA primarily affects  
synovium → cartilage  
destruction → bone  
erosion → ankylosis  
(late).**

# Case 6

**•A 16-year-old boy presents with progressive pain and swelling around the knee. X-ray shows a metaphyseal lesion in distal femur with sunburst periosteal reaction and Codman triangle. Biopsy shows malignant cells producing osteoid.**



Atypical osteoblasts that produce malignant osteoid



This sample shows abnormal malignant lamellar tissue osteoids (the red is osteoid cells undergoing abnormal mitosis)  
This confirms the diagnosis osteosarcoma

The arrow points to Codman's triangle  
You can also see the "sunburst" reaction under and around the femur

# DISCUSSIONS POINTS:

- **Q1. What is the most common primary malignant bone tumor in adolescents?**
- **Q2. What is the most common site?**
- **Q3: What genetic mutations are associated with OS?**
- **Q4. What is the most common site of metastasis?**
- **Q5. What is the diagnostic histologic feature?**

**Q1. What is the most common primary malignant bone tumor in adolescents?**



**ANSWER:**

# OSTEOSARCOMA

- Because the age is young
- The location is around the **knee** and there is a lesion in the metaphysis around the knee
- We have Codman triangle
- A biopsy is done to make sure, by confirming presence of malignant cells producing osteoid

**Q2. What is the most common site?**

**ANSWER:**

It can occur anywhere, but this is the most common location

**Metaphysis of long bones, especially around the knee (distal femur, proximal tibia)**

**Q3. What genetic mutations are associated with Osteosarcoma?**

# ANSWER:

- **RB gene mutation**
- **p53 mutation (Li-Fraumeni)**

**P53 is usually associated with Li-Fraumeni syndrome  
Patients with p53 mutations are at higher risks to develop multiple cancers including  
bone & soft tissue sarcomas**

**Q4. What is the most common site of metastasis?**

**ANSWER:**

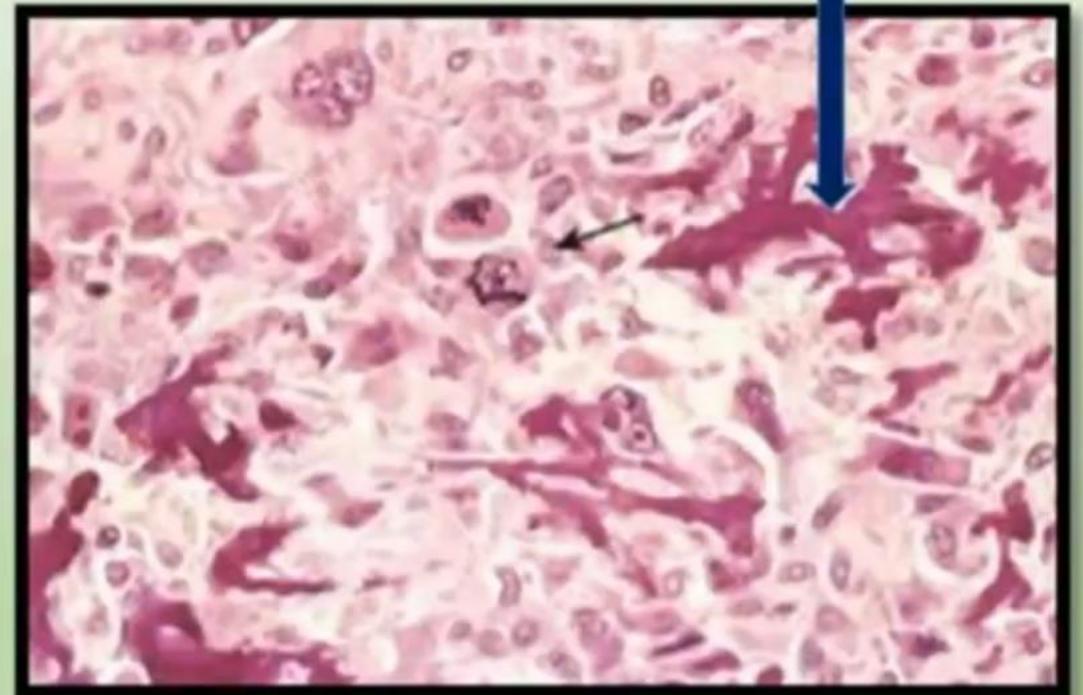
**Lungs  
(Hematogenous  
spread)**

**Q5. What is the  
diagnostic histologic  
feature?**

**ANSWER:**

**Malignant  
osteoid  
production**

Such sample is abnormal,  
showing malignant cells in  
lamellar tissue



# Teaching Pearl:

Remember the following  
pattern regarding  
osteosarcoma

**Think osteosarcoma in  
teenager + metaphysis +  
aggressive periosteal  
reaction + malignant  
osteoid on biopsy.**

# Case 7:

**A 12-year-old boy presents with fever, bone pain, and swelling in the mid-shaft of the humerus. X-ray shows a lamellated (onion-skin) periosteal reaction. Biopsy shows small round blue cells. Cytogenetics reveals t(11;22).**

## **DISCUSSIONS POINTS:**

- **Q1. What is the most likely diagnosis?**
- **Q2. What is the most characteristic genetic abnormality?**
- **Q3: What bones are commonly involved?**
- **Q4. Why it is commonly mistaken for infection?**
- **Q5. What immunohistochemical marker is usually positive?**

**ANSWER:**

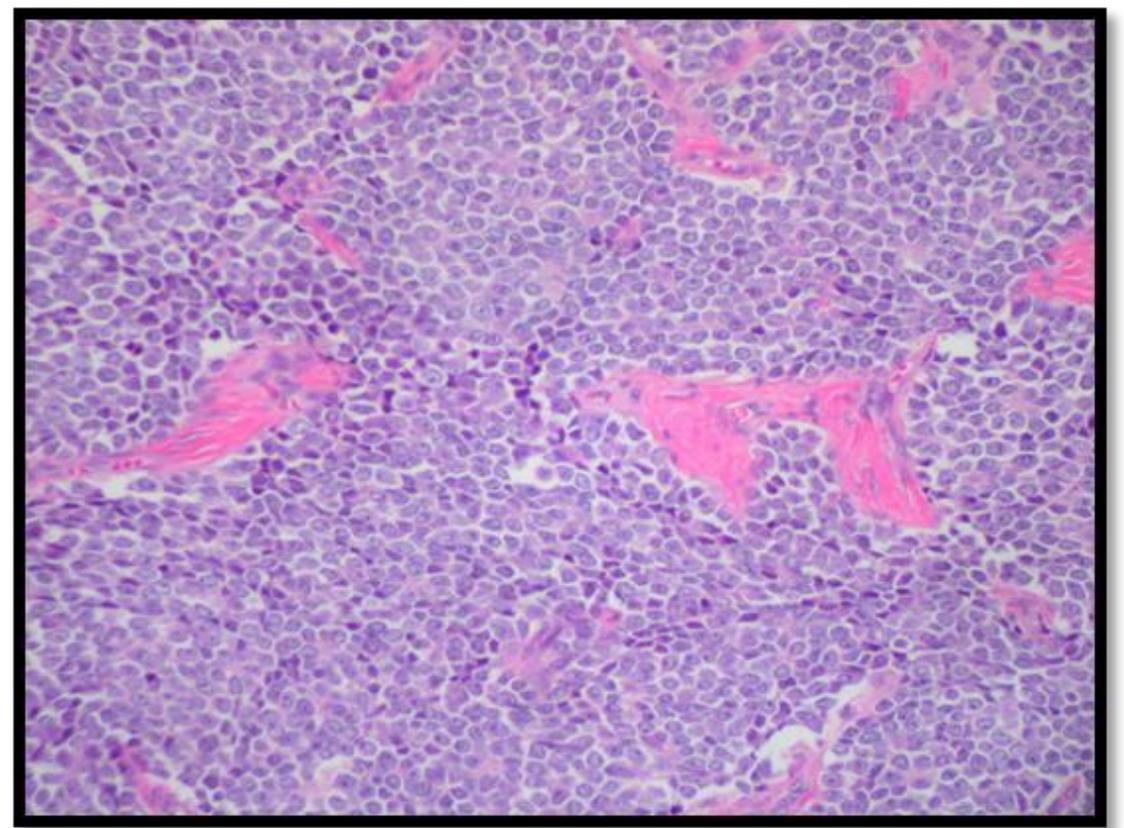
# EWING SARCOMA

- You might mix it up with another condition because of the age & the location of the swelling, but the systemic symptoms clear it up.
- Small blue cell tumors can produce mediators causing fever.
- **We confirm the diagnosis by the translocation test t(11;22)**



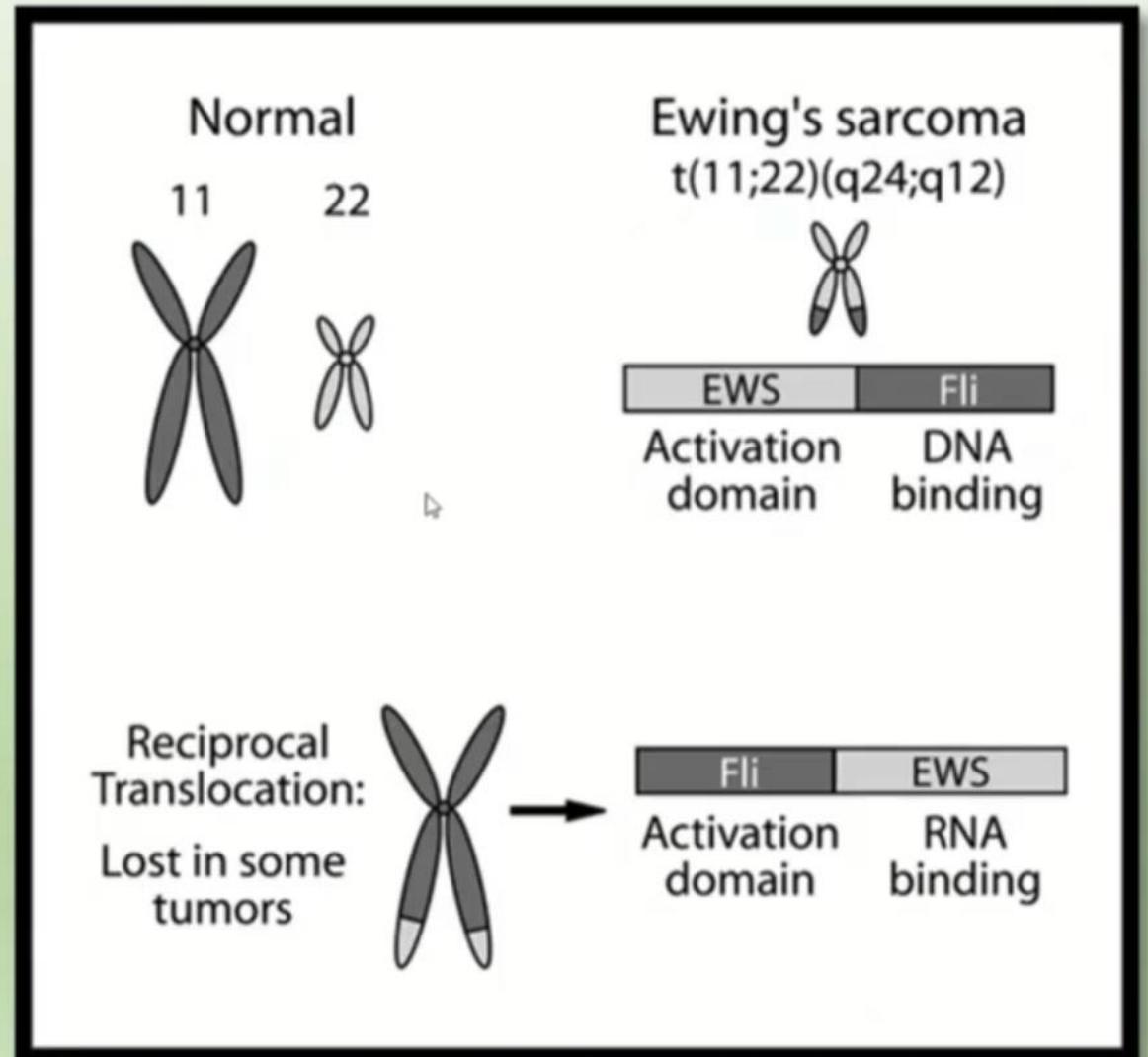
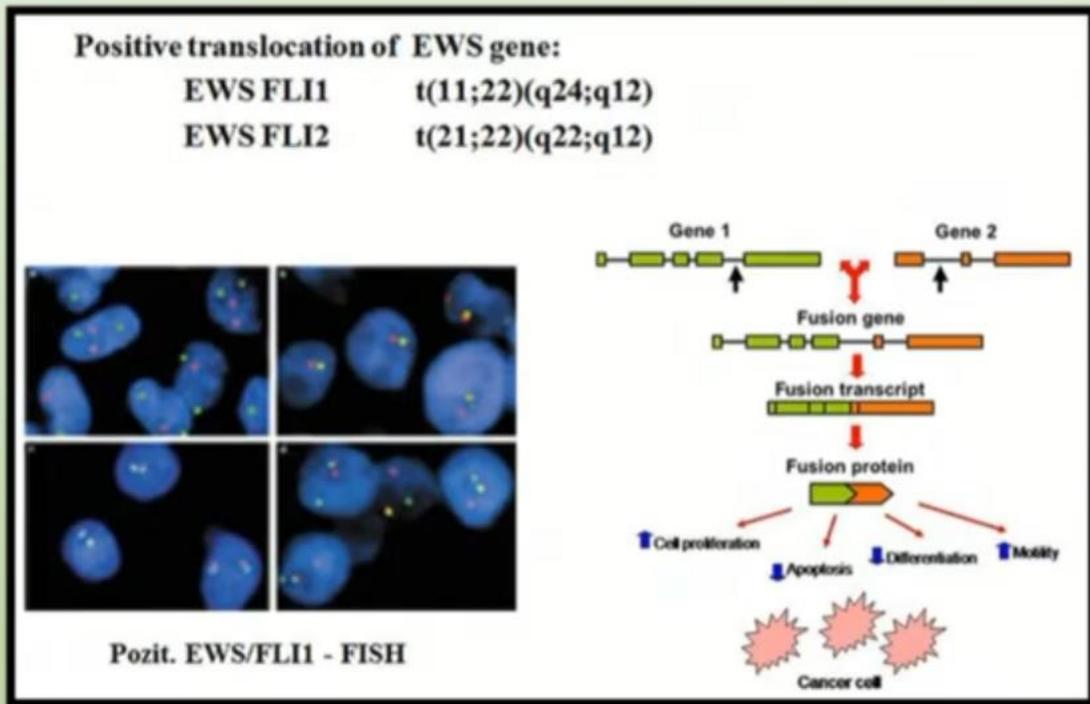
Here we see Codman's triangle however, it is not specific for Ewing sarcoma

Hence, if we see these features it is **Ewing sarcoma** until proven otherwise



Here we see small blue cells destroying the tissue

This shows the translocation t(11,22)  
 Tests & stains (FISH) are done on  
 these to confirm diagnosis



**Q2. What is the most characteristic genetic abnormality?**

**ANSWER:**

**t(11;22) → EWS-FLI1  
fusion gene**

- FLI1 has a protein product where we stain this product to test for its presence

**Q3. What bones are commonly involved?**

**ANSWER:**

**Diaphysis of long  
bones, pelvis, ribs**

**ANSWER:**

**Because of fever,  
leukocytosis, and  
elevated ESR**

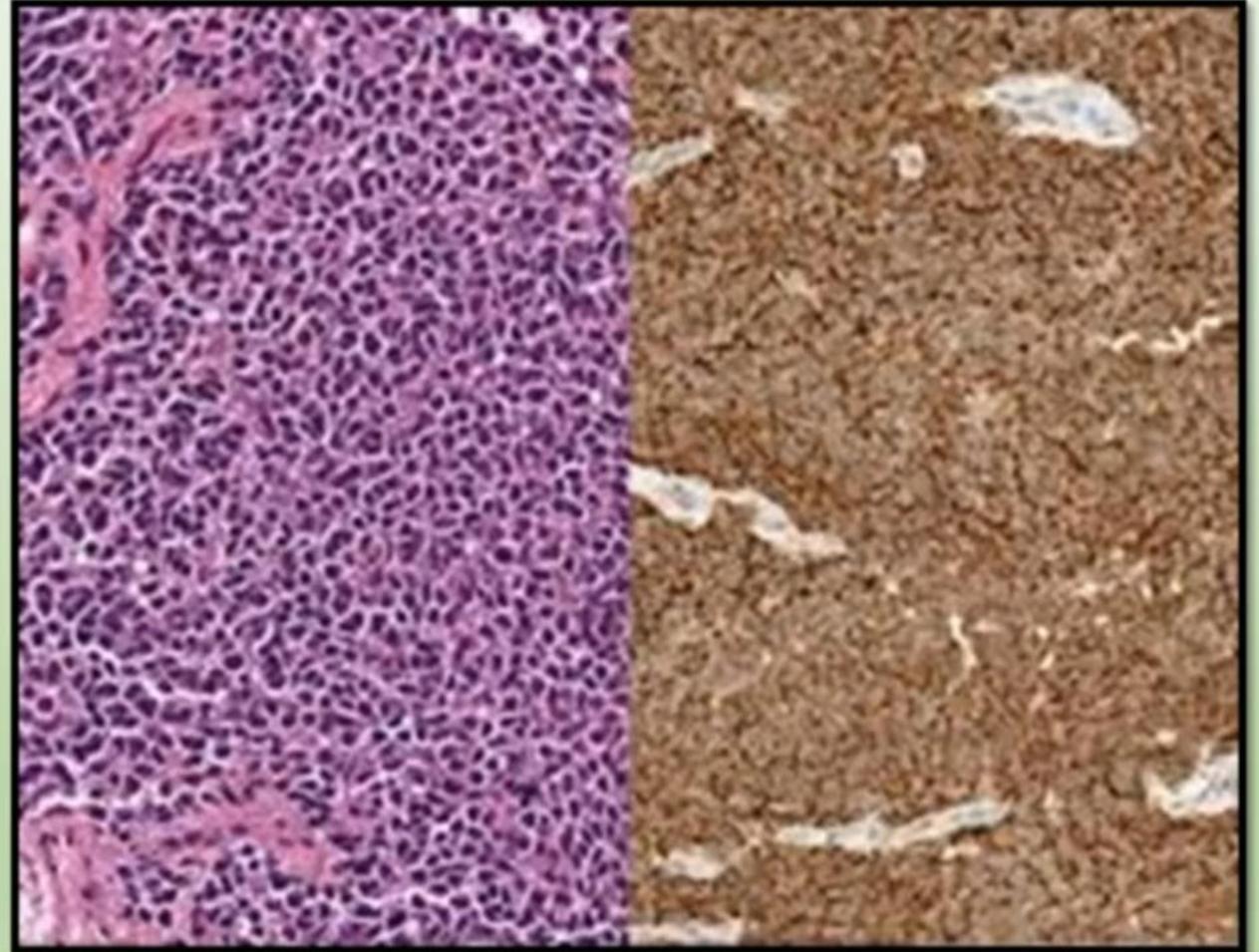
- **Fever, swelling, and pain**
- **Many tumors can cause all these symptoms especially small blue cell round tumors which one of them is ewing sarcoma**

**Q5. What immunohistochemical marker is typically positive?**

# ANSWER:

## CD99 (MIC2)

- FLI1 is new, but **CD99** has been tested for from a long time
- **CD99** it is a protein and it is the most "**sensitive**" marker.
- FLI1 is more "**specific**" for ewing sarcoma



# Teaching Pearl:

These are key features for  
ewing sarcoma until  
proven otherwise

**Child + diaphysis + onion  
skin periosteal reaction +  
small round blue cells +  
t(11;22) = Ewing sarcoma**

# Additional Resources:

# رسالة من الفريق العلمي:



وارزقني تسهيليك للأشياء  
التي لا أعرف كيف أطلبها  
منك ، اللهم <sup>سَوْسَ</sup> الخيرة في  
كلِّ شيء .

@IslamicWisdom.co

Growth

## Allah's timing, not yours.

If you're thinking "why Allah is so late at coming through?" think again. Allah is not late. His timing is perfect. It's just that He knows more than you. Maybe you are waiting on something you've prayed for; a promotion, healing, restoration, protection, or provision to your vision, whatever it is, it's coming. Be encouraged as you wait.

Yes, there will be plenty of switchbacks and hard work. Don't worry about the trail ahead. Keep your eyes fixed on Allah. Trust His timing. It is better than what we've defined as 'good timing'. When you've got a guide you can trust, who's aware of you and your needs, you don't have to worry about the path you're on.

# For any feedback, scan the code or click on it.



Corrections from previous versions:

Versions	Slide # and Place of Error	Before Correction	After Correction
V0 → V1			
V1 → V2			