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الفريق العلمي

PATHOLOGY

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Osteomyelitis

INTRODUCTION

means inflammation of the bone & marrow cavity; it is almost always due to infection

occurs mostly as an isolated disease, but it can be a complication of systemic infection (e.g. TB).

can be an

(1) acute (2) chronic

any microorganism can cause OM, the most common TB. & pyogenic bacteria

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PYOGENIC OM

* organisms reach the bone by one of 3 routes
  (1) Blood (hematogenous dissemination) ---- the most common route
  (2) Extension from adjacent joint / soft tissue
  (3) Direct traumatic implantation after fractures / orthopedic procedures

*the bacteria is :

1)Staph. aureus ~ the most frequent causal organism
2)Escherichia coli & group B streptococci ~ in neonates **B>>BABIES
3)Salmonella ~ in Sickle cell ds.
4)Mixed bacterial infections including anaerobes ~ after bone trauma

50% of cases there are no organisms

*Gross changes : depend on { .stage (acute/subacute/chronic)
.location of the infection

❖ After the first week of infection chronic inflammatory cells become more numerous

1) bacteria proliferate and induce an acute inflammatory reaction with **pus formation** (Abscess), causing bone cells death and early necrosis (formation of **sequestrum**)

2) inflammation can spread throughout the Haversian systems to **reach the periosteum**
In children, subperiosteal abscesses can extend for long distances along the bone surface because the periosteum is loosely attached to the cortex in children

3) **Lifting (pulling) of the periosteum** will compress & impairs the bone blood supply to the affected region >> **ischemic injury** >> so this will cause **segmental bone necrosis**

4) **Rupture** of the covering periosteum so the abscess will reach the surrounding soft tissue & this will lead to **formation of draining sinus** and sequestrum may fragments & forms free foreign bodies that pass through this sinus tract

❖ In infants (NOT adults): epiphyseal infection can spread into the adjacent joint causing :
- suppurative arthritis
- extensive destruction of the articular cartilage
- permanent disability.

NOTE:
IN INFANT metaphysis infection can spread to epiphesis
bcs epiphesial plate allow this spread
~`~ from metaphesis > epiphesis > articular cartilage > joint

Similarly, verterbral infection can destroy the inter vertebral disc (IVD) & spreads to adjacent vertebrae

5) **Healing** : WBCs cytokine stimulates
- osteoclastic **bone resorption**
- **fibrous tissue ingrowth**
- Reactive woven or lamellar bone formation in the periphery (a shell of living bony tissue called **involucrum** will be formed around the sequestrum)

●Viable organisms can persist in the sequestrum for years after the original infection

*Clinical features of OM :

- CLASSICALLY we have **acute systemic illness** (malaise, fever, leukocytosis, & throbbing pain over the affected region)
- IN INFANTS Symptoms can be subtle/mild , with only unexplained fever
- IN ADULT only localized pain

*Diagnosis :

- radiologic findings >> destructive lytic focus surrounded by a sclerotic rim >> اشي محطم وفي حوله حافة (بوردر) صلبة
- blood cultures >> positive
- bone biobsy >> to identify the pathogen

*TTT :

combination of antibiotics & surgical drainage BUT 25% of cases does not resolve & persist as chronic OM

*Chronic OM may develop when :

- extensive bone necrosis
- delay in diagnosis
- abbreviated antibiotic therapy
- inadequate surgical debridement
- weak host defenses

*Complications of chronic OM :

1)pathologic fractures
2)secondary amyloidosis
3)sepsis, endocarditis >>تذكري انه الانفكشن ممكن من العظم ينتقل عن طريق الاوعية الدموية والهافيرجين كانال للدم وبمجرد ما وصل الدم بقدر يوصل لأي مكان
4)squamous cell carcinoma in the sinus tract . <<RARELY osteosarcoma >>ممكن يصير ولكن نادرا.
5)Syphilitic OM >> gumma

**GUMMA :

gumma is caused by the bacteria that cause **syphilis**. It appears during late-stage tertiary **syphilis** and it is an area of extensive necrosis that can affect any part of the body such as the skull . Early diagnosis & adequate treatment of syphilis can prevent such serious complication.
_**Syphilitic gummas that affect the SKULL >>** Dried skull with multiple large ragged cavities
الجمجمة بتكون كبيرة وفيها عدة تجاويف كبيرة وممزقة

TUBERCOLOUS OM

-A problem in **developing countries** due to { immigration & immunocompromised health status of the hosts } , TB OM represents **1% to 3%** of pulmonary TB.
-Mycobacterium TB reach the bone through >> BLOODSTREAM {**usually**}
or through >> MEDIASTINAL LNs to vertebrae .. resulting in :
1) Pott`s ds. (when it reaches the vertebral coloumn)
2) It may reach the long bones
*Lesions are often **solitary** بمنطقة وحدة
BUT in immunodeficient pts.> **multicentric** اكثر من مكان
-TB bacillus is microaerophilic & synovium has the higher oxygen pressure SO :
Synovium is the common site of initial infection (then it spreads to the adjacent epiphysis) causing : 1) typical caseating granulomatous inflammation
2)extensive bone destruction.

*Pott's disease :

- It is TB osteomyelitis of the vertebral bodies
- formation of caseous abscesses will dystroy the (vertebral bodies + intervertebral discks + periosteum) and this will lead to **compression of the spinal cord & psaos(cold abscess)**

>>>NOTE : localized collection of pus without signs of **inflammation** is called cold abscess. It is usually caused by **tuberculosis**

- TB of the vertebral bodies will lead to :1) vertebral destruction, collapse
2) secondary neurologic deficits (e.g., paraplegia)
3) Extension of the infection to the adjacent soft tissues
4) development of psoas muscle abscesses(cold abscess) and this may present as a mass in the right iliac fossa

means it lacks cardinal features of acute abscess