(Lecture 7)

- Joint basic knowledge

*Joints are important in the locomotive system it's provide motion (flexion, extnction...) & and stability to our skeleton (shock absorber) & and there is Tow type of major Joints:-

① Synovial (cavitated): Synovial Joints, wide motion (knee & elbow ...) & it's covered by hyaline cartilage an important structure for motion & shock absorbtion contain (70% water, 10% type II collagen, 8% Proteoglycans + chondrocytes) and it doesn't have blood or nerve or lymph supply, The synovial membran contain: A synoviocytes (different macrophage) and B synoviocytes fibroblast-like and lacks basment membrane (don't have collagen IV in the laminin)

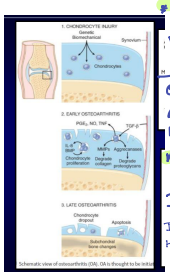
② non-synovial (solid): Synarthrosis, minimal movement (skull, sternum)

- Joint diseases

① osteoarthritis (DJD): better Pathologic term is "degenerative Joint disease" (DJD) Degeneration of Cartilage. not true ITIS (not true inflamatory process) & insidious of disease increase with age (>50) & happend becouse imbalance between degeneration and repair of the cartilage (degeneration >> repair and Proliferation.

osteo arthritis classified into: ① Primary or idiopathic: most common & incidence increase with age & affect few major Joint (knee, elbow, palm)

② secondary: less common & occur due to preexisting disease & if he was have disease in right knee so it's may be affected



*Pathogenesis

injury to chondrocytes due to Genetic and bio chemical Predisposition with inciting trauma to Joint area

early stage & it will cause lines of aberration & erosion of the articular cartilages

inflamatory mediator release (TNF & NO & PGE2)

repair by (TGF-B) mediator will be involves for chondrocyte Proliferation (IL-8, BMP)

This take week, month, years

In late stage inability of the Proliferation and repair lead to apoptosis and chondrocyte dropout will lead to spacing between cartilages and irregular appearing thicker cartilages

space between bone & the edges of bone and structure are normal

* Pathogenesis will impact synovial space especially in large Joint

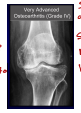
The main feature:- ① eating cartilages (cartilages cap loss) ② Bone spurs ③ loos bodies in between which cause more distraction and narrowing Joint space

* The evolution of osteoarthritis goes through grades

here sever osteoarthritis which lead to subchondral reaction → sclerosis → cyst formation with loos bodies space causing pain and stiffnes of Joint

The space between bone narrowed → sclerosing of the under lying bone

The bone spurs start to appear at the lateral side of knee



sever narrowing + degeneration of the articular cartilage

sclerosis of subchondral bone

multiple cyst formation

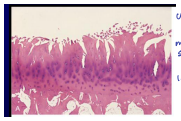
bone spurs in medial side

* osteoarthritis Clinically:-

Joint pain worsens with use / morning stiffness / crepitus: due narrowing Joint space

rang limitation / radicular pain: when it goes near neurons / osteophytes impingement on vertebra

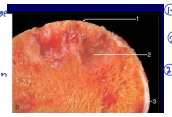
muscle spasm & atrophy There is no magic preventive strategies



upper part: apoptotic cartilage

middle part: sclerosis of the subchondral bone

lower part: cyst formation



① complete cartilage loss

② hemorrhage + cyst formation + some sclerosis

③ normal cartilage

* Treatment: Pain control & decrease inflmation (NSAIDs) intra articular steroid, joint replacment for sever cases / osteoarthritis and its complication have large health cost on countries

② Rheumatoid Arthritis: chronic systemic inflamatory disease, autoimmune in nature & attacks Joints with nonsuppurative & inflamatory synovitis lead to destruction of Joint

(true "ITIS") — immunity attack Joint — multi-organ disease affect skin heart, vessels & lung — There is no bactria and Pus formation — Proliferative: Proliferation to fibroblast — target synovium of Joint

$ DJD → affect articular cartilage / Rheumatoid → target synovium mainly

"Etiology"

Patho Physiology ⟶ Genetic Predisposition + enviromental factor (Play role in development & Progression & Chronocity of the disease)

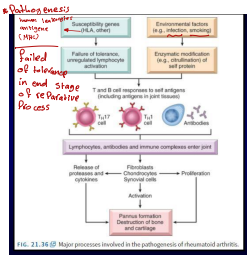


FIG. 21.36 Major processes involved in the pathogenesis of rheumatoid arthritis.

autoimmun → involves multiple mediator

IFN-γ from Th1	Activates macrophages & synovial cells
IL-17 from Th 17	Recruits neutrophils and monocytes
RANKL from T cells	Stimulates osteoclasts & bone resorption
TNF & IL-1 from macrophages	Stimulates residents synoviocytes to secrete proteases that destroy hyaline cartilage

الدكتور حكى عنه مهم

This is The major Player

* Diagnosed:- ① blood test → (IgG & IgM against the Fc Portion of their own IgG)

② 80% of RA have positive Rheumatoid factor

③ 70% of RA have anti citrullinated Protein antibodies (ACPA)

* Treatment: Steroid & Anti-TNF & methotrexate (immunosuppressor drug)

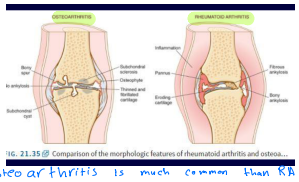
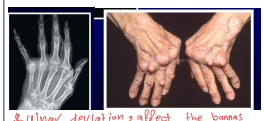


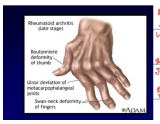
FIG. 21.35 Comparison of the morphologic features of rheumatoid arthritis and osteoarthritis.

* osteo arthritis is much common than RA

RA Clinically: Begins slowly & insidiously / Polyarthritis (multi symetrical Joints: hands & feet & wrist & ankle MCP & Proximal IPJ)

Joint → warm → swollen → painful / stiffness when inactive & in the morning / waxing and waning chronic & ulnar deviation



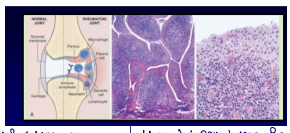


* Boutonniere deformity of the thumb: thumb tend + point unable to hyperextend the IP point

* ulnar deviation: deviation of MCP Joint toward ulnar Joint

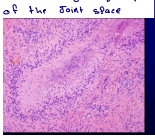
* swan neck deformity of fingers: hyper flexion in distal IP Joint

* ulnar deviation, affect the bannas formation of small Joint



Proliferative Autoimmune synovitis with Pannus formation leading to the distraction of cartilages with narrowing and kyloses of the Joint space

this biopsy taken from the synovium, shows severe blue cell proliferation and infiltration



Sometimes RA lead to chronic granulomatous inflamation

we can see nodules

Rheumatoid granulomas

active epithelioid histocytes associated with central necrosis

③ Juvenile Idiopathic Arthritis (JIA): another form of RA

hetrogenous group of unknown cause & affect children less than 16 years & symptoms should last for 6 week at least to diagnosed & Pathogenesis similar to adult RA

Prognosis variable: only 10% will have serious functional disability

IN CONTRAST TO ADULTS RA; JIA IS CHARACTERIZED BY:
Oligoarthritis is more common
Systemic disease is more common
Large joints are affected more than small joints
Rheumatoid nodules and Rheum Factor are usually absent
Anti Nuclear Antibody seropositivity is common

(4) Seronegtive Arthro Pathies :- family Joint disorder

Pathogenesis :- auto immune T cell response to unidentified antigen (Possibly infectious agent) that cross react with self - musculoskeletal antigene

HETEROGENOUS GROUP THAT SHARE THE FOLLOWING FEATURES:
Absence of rheumatoid factor
Ligaments pathology rather than synovium
Sacroiliac joints mainly
Association with HLA-B27 Strongly associated
Bony ankylosis (fusion)

- **Ankylosing Spondylitis:** The most common Pretype anti IL-17 show efficacy as a treatment
  - Adolescent boys, HLA B27, axial joints (sacroiliac)
- **Reiter Syndrome:** 90% have Patient
  - Triad of arthritis, urethritis/cervicits & conjuctivitis
  - Autoimmune but initiated by bacterial infection.
- **Enteropathic Arthritis:**
  - Secondary to bowel infections (salmonella, shigella)
  - HLA B27 positive
- **Psoriatic Arthritis:**
  - 5% of patients, starts in DIP joints, similar to RA.

Distal InterPhalangeal

Spondyloarthropathies: Subtype Classification

Ankylosing Spondylitis	Psoriatic Arthritis	Enteropathic (IBD-associated)	Reactive Arthritis	Undifferentiated SpA
Most common subtype along with uSpa 2.5:1 male:female Gradual onset of IBP Acute anterior uveitis most common extra-articular manifestation Can lead to sacroiliac fusion and spinal syndesmophyte formation	Between 10% and 40% of patients with psoriasis develop PsA, depending on study population and psoriasis severity Most phenotypically diverse SpA with 5 subtypes Skin disease precedes joint disease in approximately 70% of cases	5% to 29% of patients with IBD develop arthritis Peripheral arthritis (not axial) can parallel bowel inflammation and can occur in up to 20% of patients Spondylitis occurs in 3% to 6%	Typical acute asymmetric oligoarticular (<4 joints) arthritis 1-3 months after gastrointestinal and genitourinary infection Characteristic triad of urethritis, conjunctivitis, and arthritis seen in < 35% of patients Keratoderma blennorrhagica and circinate balanitis	Most common subtype along with AS Typically used to describe patients not fulfilling criteria of any one SpA but presenting with IBP and other extra-articular SpA manifestations Up to 50% of uSpA will develop into AS

uSpA = undifferentiated SpA; IBP = inflammatory back pain; PsA = psoriatic arthritis; IBD = inflammatory bowel disease; AS = ankylosing spondylitis