RHEUMATOID ARTHRITIS

↓ Musculoskeletal illness ↓ Joints ↳ Inflammation.

- One of the most common Chronic inflammatory arthritis.

Etiology: Autoimmune disease

① Genetic
↓
- HLA DR1
- HLA DR4

② Environmental
↓
- Cigarette smoking
- Infections like Epstein Barr virus, Porphyromonas gingivalis

③ Hormonal
↓
- Breastfeeding ↑ risk due to ↑ Prolactin ∵ Proinflammatory
- Nullyparity.

Pathology

In persons with HLA DR4 & HLA DR1 when the smoke
↓
By Modification of own own antigen (Type II collagen & Vimentin)
↓
∵ Arginine converted to Citrulline (Citrullination)
↓
Now Immune cannot differentiate the Self antigen so picked up by APC Antigen presenting Cells (Macrophage, Dendritic, B lymphocyte)
↓
Released in lymph node by antigen presenting cell to CD4 T-Helper cell.

In lymph node:

- Antigen presenting cell activates CD4 T helper cells
  - T cell ↓ stimulates
  - B cells
  - ↓
  - Proliferate into Plasma cells
  - ↓
  - Produce specific antibodies against them.
  - ↓
  - Enters circulation → Joint space.

In Joint space:

T cells
↓ secrete
Cytokines (Interferon γ, Interleukin-17)
↓
More macrophages
↓
More cytokines
↓
Synovial cells proliferates
& New Blood Vessel formation (Angiogenesis)
↓
"PANNUS" (Thick, swollen synovial membrane with granulation tissue like fibroplast & macrophages & new blood vessels).
↓ Secretes
Proteases & elastases
↓
Cartilage Erosion

Antibodies:

i) Rheumatoid Factor RF (IgM)
ii) Anti body to Cyclic Citrullinated Peptides (Anti-CCPs)
↓
React with Citrullinated protein
↓
Forms Immune complexes.
↓
Activates Complement System (a small protein & Enzymes).

Inflammatory Cytokines → T cells → RankL & combines → Osteoclasts
Rank
↓ Travel to multiple Joints & Both sides cause inflammation.
↓ Also travel to extra articular places and affect Skin, Muscle, Brain, lung, liver, Blood Vessels.
↓ Breakdown Bone.

Clinical features:-

Onset - Insidious., Location - Polyarthritis, 5 more. Symmetrical.

Common Joints → Small Joints (Metacarpophalangeal Joint (MCP) Proximal interphalangeal joint (PIP). Distal Interphalangeal Joint (DIP)

As Disease worsens (Large Joints) → Shoulder Joint, Elbow Joint, Knee Joint, Ankle Joint.

Sensation → Morning stiffening, after resting

Acute Flares → Redness, Swelling, Warm. Painful

Special Deformities Hand

① Swann Neck Deformity: Hyperextension of PIP and flexion of Distal IP. Impair Hand grip.

② Boutonniere or Button Hole Deformity: Extensor tendon on the back of PIP breaks so the head of proximal phalanges POKE through causing Flexion of PIP & Hyperextension of DIP.

③ Z shaped thumb (Hitchhiker's thumb) - Thumb becomes Z shaped.

④ Ulnar deviation of hands.

⑤ Dropped fingers → Due to attrition of Extensor tendon

Legs

1) Baker or Popliteal Cyst: - Synovial fluid buldges out posteriorly and causes swelling in popliteal fossa which make break and cause painful swelling in calf.
2) Hammer toe: Flexion of PIP and Hyperextension of Meta tarsal phalangeal joint.
3) Hallux valgus: lateral deviation of big toe.
4) Arch of Foot is lossed
5) Calloities develop on Bony points.

Vertebra:

1) Antlatoaxial subluxation due to p. weakening of transverse ligament. (Clucking sound of neck inflexion)
2) Tempuromandibular arthritis causing pain during mastication.

Extra articular

1) Skin → Rheumatoid nodules. painless, non tender nodules from few mm to cm in the extensor aspects of the elbow.
2) Muscle → Break down of proteins.
3) Blood vessels → Atherosclerosis.
4) Brain → Pyrexia
5) Eyes → Scleromalacia peyonare, Scleritis.
6) Lungs → Interstitium → Fibroblast → Scard tissue → ↓ Gas exchange
   Pleura → Pleural effusion: [Caplan's Syndrome]
7) Liver → ↑ Hepcidin → Causes ↓ Iron by inhibition absorption & trapping in macrophage / liver cells.
8) Neurology → Entrapement neuropathy, Cervical cord compression. Carpal Tunnel syndrom

Caplan's Syndrome:

- Also called as Rheumatoid Pneumoconiosis.
- Rheumatoid arthritis + Pneumoconiosis.
- Who have inhaled dust like coal, metals, minerals.
- It manifests as intrapulmonary nodules that appear well defined on chest x-ray.
- Rales which do not disappear on coughing on taking deep breath & symptoms of RA.

Felty's Syndrome:

S - Splenomegaly
A - Anemia
N - Neutropenia
T - Thrombocytopenia
A - Arthritis (Rheumatoid)

Sjogren's Syndrome

- Chronic autoimmune disease characterized by mixed cellular infiltration of the exocrine glands.
- Usually associated with Rheumatoid arthritis.
- They are predisposed to MALT lymphoma.
- Dry mouth (xerostomia), Dry eyes (xeropthalmia). Arthritis. Parotid enlargement.
- Raynaud's Phenomenon.
- Schirmers test positive → Filter paper in eyes ✱ positive if wetting ~~more~~ less than 5mm in 5 minutes.

Laboratory Diagnosis:

Serology:

i) Rheumatoid Factor (IgM Antibodies) - 70-80%.
Titers increase between 3-6 months.

ii) Anti-Cyclic Citrullination peptide (Anti-CCP) Antibody.
- New early diagnosis. even before arthralgia.
- Specific to RA. - 95% cases.

iii) Antinuclear Antibody
- Usually non-specific, 30% cases

↑ ESR, ↑ C Reactive protein _ Normochromic Normocytic Anemia, Iron Deficiency anemia.

Radiology:

Grade I → Soft tissue swelling (Synovitis)
Grade II → Narrowing of Joint space (Cartilage destruction)
Grade III → Erosion of Bone
Grade IV → Irregularity of articular surface, Subluxation.

Synovial Fluid Aspiration:

→ ↑ WBC, ↑ Neutrophils, Complement low, ↑ Protein.

Differential diagnosis

1. Psoriatic arthritis 2. Gout 3. Osteoarthritis, 4. Syphilitic, 5. Gonococcal 6. Reactive 7. Ankylosing spondylitis.

Treatment & Management:

- Avoid fish, pear, carrot, Sea salt, mineral water, wheat
- Suppress Inflammation, Cytokines, NSAIDs, Glucocorticosteroids