

Chapter 39 – RA, Lupus, Osteoarthritis, Fibromyalgia, and Raynaud’s Syndrome:

Rheumatic Diseases –

- 3 distinct characteristics – inflammation, autoimmunity, and degeneration
- **Inflammation** – occurs in response to harmful stimuli like damaged cells or pathogens
 - o Meant to protect the body from insult – by removing the triggering antigen or event
 - o In response to triggering episode – antigen stimulates T lymphocytes → immunoglobulin antibodies form immune complexes with antigens → phagocytosis of immune complexes (generating inflammatory reaction) → phagocytosis produces leukotrienes and prostaglandins → both release enzymes (collagenase) to break down collagen → edema and proliferation of synovial membrane
 - If this is a chronic condition instead of resolution occurring → **pannus (proliferation of newly formed synovial tissue infiltrated with inflammatory cells)**
- **Autoimmunity** – hallmark of rheumatologic diseases → body mistakenly recognizes its own tissue as a foreign pathogen (antigen)
 - o **Autoimmunity leads to destruction of tissue**
- **Degeneration** – in degenerative rheumatic diseases – inflammation also occurs but as a secondary process

Clinical Manifestations – most common in rheumatic diseases = pain (also includes joint swelling, limited movement, stiffness, weakness, and fatigue)

Laboratory Studies –

1. **Rheumatoid factor:** determines the presence of abnormal antibodies seen in connective tissue disease
 - **Normal Values** – negative
 - **Significance** – Positive titer > 1:80
 - o Present in 80% of those with RA
 - o Positive RF may also suggest SLE, Sjogren syndrome or mixed connective tissue disease
 - o **The higher the titer the greater the inflammation**
2. **Erythrocyte sedimentation rate:** measures the rate at which RBCs settle out of unclotted blood in 1 hour
 - **Normal Values** – Men under 50 = <15 / Men over 50 = <20
 - Women under 50 = <25 / Women over 50 = <30
 - **Significance** – ESR increase is usually seen in inflammatory connective tissue diseases
 - o An increase indicated rising inflammation, resulting in clustering of RBCs → makes them heavier than normal
 - o **The higher the ESR the greater the inflammatory activity**
3. **Antinuclear antibody:** measures antibodies that react with a variety of nuclear antigens
 - If antibodies are present further testing determines the type circulating in the blood
 - **Normal Values** – negative (a few healthy adults have a positive ANA)
 - **Significance** – Positive test is associated with SLE, RA, scleroderma, Raynaud's disease, Sjogren syndrome, necrotizing arthritis
 - o **The higher the titer the greater the inflammation**
4. **Uric acid:** measures level of uric acid in the serum
 - **Normal Value** – 2.5-8mg/dL
 - **Significance** – increase is seen in gout
5. **Human Leukocyte antigen:** measures the presence of HLA antigens, which are used for tissue recognition
 - **Normal Value** – negative
 - **Significance** – found in 80-90% of those with ankylosing spondylitis and Reiter's syndrome

6. **Calcium** - normal range is 8.5-10.2
 - Will see a decrease in serum calcium in bone disorders
7. **Phosphorus** - normal range 2.4-4.1
8. **C-reactive protein** - shows presence of abnormal glycoprotein due to inflammatory process
 - **Normal Value** - <1mg/dL
 - **Significance** - a positive reading indicates active inflammation
 - o Test is often positive for RA and SLE
9. **Creatinine Kinase (CK)** - metabolic waste excreted through the kidneys
 - **Normal Value** - 0.7-1.4
 - **Significance** - increase may indicate kidney damage in SLE, scleroderma, and polyarteritis

Pharmacologic Therapy - used to manage s/s, control inflammation, and sometimes modify the disease

- NSAIDs
- DMARDS - have the ability to alter disease progression and stop or decrease further tissue damage
 - o **Nonbiologic DMARDS** - thought to reduce proinflammatory cytokines and increase anti-inflammatory cytokines
 - o **Biologic DMARDS** - specifically engineered to target a certain cell or molecule within the immune system to treat the specific rheumatologic condition
 - Target TNF

Nonpharmacologic Therapy -

- Heat - to relieve pain, stiffness, and muscle spasm
 - o Paraffin baths
- Braces, splints, and assistive devices
 - o **Splint** - may be used for conditions that do not require rigid immobilization, for those which swelling is anticipated, and for those requiring special skin care
 - Do not compromise circulation like casts can
 - o **Braces** - used to provide support, control movement, and prevent additional injury
 - Used longer than splints
 - o **Both splints and braces permit more movement at injury site than casts do**

Exercise and Activity - important to maintain

- Appropriate exercise programs - decrease pain and improve joint mobility
- Give mild analgesic before exercise - to decrease pain and relax muscles
- ROM - maintain flexibility and joint motion - can be active or active/self-assisted - should be done daily
- Isometric exercise - improve muscle tone, static endurance, strength, prepare for dynamic and weight bearing exercises - perform at 70% of maximal voluntary contraction daily
- Dynamic exercise - maintain or increase dynamic strength and endurance - increase muscle power, enhance synovial blood flow, and promote strength of bone and cartilage
- Aerobic exercise - improve cardiovascular fitness and endurance

Autoimmune Disease - malfunction in the immune system

- Will be giving these patients' immune suppressive meds
- The immune system fights with antibodies to destroy antigens
- In these disease the immune system loses its autoimmunity - ability to distinguish normal from abnormal tissue
- These are systematic diseases

Rheumatoid Arthritis - autoimmune connective tissue disease of the joints

- Autoimmune disorder - immune system triggers a response
- Higher occurrence in women until age 65 when men are equally affected
- RA - is hereditary
- RA involves multi systems
 - o Example - in RA you have hand deformities - they are generalized as opposed to osteoarthritis which is specific
- Juvenile RA - may have morning stiffness and flu like symptoms, and joint pain
 - o IT is OKAY to give these pts NSAIDS - as long as their kidneys are okay

Etiology and Risk Factors -

- Trigger = an infectious agent
- EBV, viruses
- Genetics - high incidence in twins
- Smoking
- Women - reproductive hormones may influence development of RA
- Physical and emotional stress

Patho -

- The autoimmune reaction originates in the synovial tissue
 - o RA synovium breaks down collagen → edema, proliferation of the synovial membrane, and pannus formation
 - Pannus - destroys cartilage and erodes bones
- Chronic, progressive, systemic - there is no cure
- Periods of exacerbations and remissions - when there is a flare up that is when we treat
 - o Remission - period when disease s/s are reduced or absent
 - o Exacerbations - period when s/s occur or increase
- Affects synovial joints
- Autoantibodies (rheumatoid factors - RF) - attack healthy tissue → inflammation
 - o We can draw an RF factor to check
- Phagocytes - attempt to engulf the IgM and IgG complexes and release powerful cytokine enzymes such as tumor necrosis factor (TNF)
 - o TNF affects lipid metabolism, coagulation and insulin resistance
 - o Medications work on TNF
- B and T lymphocytes stimulated and increase inflammatory process

- Inflammation first in synovial membrane which lines the joint cavity
- Then moves to the articular cartilage, joint capsule, and surrounding ligaments and tendons

- Pannus - highly vascular granulation tissue composed of inflammatory cells
 - o Erodes articular cartilage and destroys bones
 - o Forms very stiff joints - able to see on an x-ray
- Eventually leads to secondary osteoporosis
- Joint deformity - results from repeated attacks
 - o Swan neck and ulnar deviation
- Since RA is a systematic disease there are other areas affected -
 - o Blood vessels → vasculitis (inflammation of blood cells)
 - o Eventually organ failure

Clinical Manifestations -

- Onset may be acute and severe OR slow and insidious