

RHEUMATOID ARTHRITIS (RA)

Rheumatoid arthritis is an autoimmune systemic disease which means that your immune system attacks healthy cells in your body by mistake causing inflammation (painful swelling) in the affected parts of the body. RA mainly attacks the joints, usually many joints at once. The course of the disease is variable and extra articular structure such as the eyes, lungs, lymphoid tissues may also be effected.

CAUSES:

The exact cause of R.A is not yet known. Inflammation in R.A appears due to disorder in the body's immune system. The continuous inflammation in the joint accounts for the damage of the joints. A virus may trigger the inflammatory process although the nature of the virus is not known. The following factors have been thought to play a role in causation of the disease:

- A genetic predisposition is strongly suspected because of certain histocompatibility markers associated with it (HLA -drw4/ HLA – DR1).
- Agents such as mycoplasma, clostridium and some viruses (EB virus) have been implicated in its aetiology.
- It is also believed that rheumatoid arthritis results from exposure of a genetically predisposed individual to some infectious agents. This leads to autoimmunity and formation of immune complexes with IGM antibodies in the serum – these immune complexes are deposited in the synovial membrane and initiate a self perpetuating chronic granulomatous inflammation of the synovial membrane.
- Factors like climate, race, diet, psychosomatic disorders, trauma, endocrine dysfunction, biochemical disorders, hereditary influences, disturbance in the autoimmunity and infection have been found to initiate the rheumatoid process.

PATHOLOGY:

- Initially the synovium becomes oedematous, filled with fibrin exudates and cellular infiltrates. There is increase in cellular fluid. As the inflammation persists, the synovium gets hypertrophied and surrounds the periphery of the articular cartilage to form pannus.
- The pannus extends over the cartilage from the periphery and burrows into the subchondral bone. With the progression the cartilage worn off and the bone surface becomes raw.
- The joint gets deformed initially because of severe muscle spasm with pain and later due to fibrosis of the capsule and other soft tissue structures.
- In an advanced disease the joint capsule gets distended by hypertrophied synovium and synovial fluid and the ligaments supporting the joints are stretched resulting in subluxation of the joint.
- Peri-articular tissues like tendons and muscles become oedematous and infiltrates with cells and may rupture.

SYMPTOMS:

The main symptoms of rheumatoid arthritis are:

- Joint pain
- Joint swelling, warmth and redness
- Stiffness, especially first thing in the morning or after sitting still for a long time.

Other symptoms can include:

- Tiredness and lack of energy – this can be known as fatigue
- A poor appetite (not feeling hungry)
- A high temperature, or a fever
- Sweating
- Dry eyes – as a result of inflammation
- Chest pain – as a result of inflammation.

CRITERIA FOR DIAGNOSIS OF RA (AMERICAN RHEUMATISM ASSOCIATION):

The seven diagnostic criteria for rheumatoid arthritis (RA), which were defined in the year 1987 include the following:

- Morning stiffness in and around joints lasting at least one hour before maximal improvement
- Soft tissue swelling of three or more joint areas observed by a physician
- Swelling (arthritis) of the proximal interphalangeal, metacarpophalangeal or wrist joints
- Symmetric joint swelling
- Rheumatoid nodules
- The presence of rheumatoid factor in blood tests
- Radiographic erosions and periarticular osteopenia in hand or wrist joints or both

STAGES OF RA:

Joint changes progress through the following three phases:

Stage I- Inflammation of synovial membrane spreads to articular cartilage and other soft tissues. There is limitation of joint movement with pain and spasm.

Stage II- Granulation tissue formation occurs within the synovial membrane and spreads to the periarticular tissues. The cartilage starts disintegrating and joint is filled with granulation tissue. There is thickening of joint capsule, tendon and their sheaths impairing the joint movement permanently.

Stage III- The granulation tissue gets organized into fibrous tissue with adhesion between the tendons, joint capsule and articular surfaces. They may give rise to contractures and ankyloses of the joint or secondary osteoarthritis.

JOINTS AFFECTED IN R.A:

COMMON: MP joints of hand, PIP joints of fingers, wrist, knees, elbows, ankles.

LESS COMMON: Hip joint, TM joint

UNCOMMON: Atlanto-axial joint, facet joints of cervical spine.

DEFORMITIES IN R.A:

HAND: Ulnar drift of the hand, Boutonniere deformity, Swan-neck deformity

ELBOW: Flexion deformity

KNEE: Flexion deformity, triple subluxation

ANKLE: Equinus deformity

FOOT: Hallux valgus, Hammer toe etc.

RHEUMATOID NODULE:

Rheumatoid nodules are firm lumps under the skin. They tend to form close to joints in people affected by rheumatoid arthritis. These bumps can be as large as a walnut or as small as a pea. The most common locations for rheumatoid nodules are: Hands, elbow, fingers, knuckle, Elbows and ankles. The nodules are made up of the following components:

Fibrin - This is a protein that plays a role in blood clotting and can result from tissue damage.

Inflammatory cells - Rheumatoid arthritis can cause inflammation in the body that leads to the development of nodules.

Dead skin cells - Dead skin cells from proteins in the body can build up in the nodules.

RHEUMATOID FACTOR (RF):

A rheumatoid factor test measures the amount of rheumatoid factor in your blood. Rheumatoid factors are proteins produced by your immune system that can attack healthy tissue in your body. R.F can belong to any class of immunoglobulins i.e. IgG-RF, IgM RF, IgA RF or IgE RF, but commonly done test detect only IgM type RF. High levels of rheumatoid factor in the blood are most often associated with autoimmune diseases such as rheumatoid arthritis and Sjogren's syndrome. But rheumatoid factor may be detected in some healthy people, and people with autoimmune diseases sometimes have normal levels of rheumatoid factor.

INVESTIGATIONS:

Radiological examination-X rays: The following features may be present:

- Reduced joint space
- Erosion of articular cartilage
- Subchondral cyst
- Soft tissue shadow
- Deformities of hands and fingers

BLOOD: It shows the following changes:

- Elevated ESR
- Rheumatoid factor (RF): It can be detected by the following tests:

- *Latex fixation test:* This is an agglutination test where the antibodies are coated latex particles. Positivity in titres more than 1/20 is significant. Sensitivity is 80%.
- *Rose-Waaler test:* In this agglutination test sheep's red blood cells are used as a carrier. Sensitivity is 60%.
- Synovial fluid examination
- Synovial biopsy

TREATMENT:

Medical treatment: It consists of anti-rheumatic drugs. These consist of ;

- Non-steroidal anti-inflammatory drugs (NSAIDs).
- Disease modifying anti rheumatic drugs (DMARDs).
- Steroids.

Surgical treatment: It consists of:

Preventive surgery: This is done to prevent damage to the joint and nearby tendons by the inflamed, hypertrophied synovium. It consists of synovectomy of wrist, knee and MP joints.

Palliative surgery: This is done where corrective surgery is not permitted but where some relief can be provided by limited surgical procedures such as bone block surgery, tendon lengthening etc.

Reconstructive surgery: It includes tendon transfers, arthroplasties and total joint replacement.

PHYSIOTHERAPY MANAGEMENT:

Principles of physiotherapy:

- Relief of pain and inflammation,
- Prevention of deformity,
- Correction of deformity,
- Restoration and maintenance of joint motion,
- Improvement of muscle strength and endurance,
- Guidance and training to achieve optimum function.

The type of measures adopted depends on the clinical status of the disease,

The Physiotherapy treatment of RA is divided into two phases-

- 1) Acute phase or active phase
- 2) Chronic phase

ACUTE PHASE (3-4 WEEKS):

During this phase the acute symptoms such as pain, erythema, tenderness and swelling are present.

- Properly supported positioning of the involved joints and correct bed position/ posture are important. The use of firm mattress minimizes the effects of malpositioning and thereby preserves the integrity of the affected joints. The limb must be placed in a position of minimal discomfort.

- Deep breathing exercises are very important to improve the V.C.
- Splints and Bandages may provide additional support to the limb whereas special attention is required for the knee and elbow joint as they are prone to develop flexion contractures.
- Full ROM exercises and progressive resistance exercises (PRE) should be given to the joints and muscles free from immobilization.
- Postural guidance and methods of performing activities without putting extra strain on the affected joints are taught.
- In cases where weight-bearing joints are involved the upper extremities should be prepared for future crutch walking.
- Isometrics – isometric exercises do not involve movements of the joint and are therefore relatively painless. These exercises should be started at early stage, muscle like quadriceps and deltoid are susceptible to disuse atrophy and hence need to repeat the sessions of isometrics. No heat therapy should be given to the joints which are already warm.
- TENS, pulsed ultrasound, ice massage or ice packs for longer periods offer reduction in the muscle spasm and pain.

CHRONIC PHASE:

It is a phase of vigorous activity to train the patient to use the involved joints to the greatest extent.

- Efforts should be made to improve the strength and endurance of the muscle related to the affected joints.
- Sustained or intermittent stretching is required to the joints which have developed tightness or contractures during the acute phase. Education and assistance are provided in adopting functional positioning, speed and proper gait.
- However weight bearing should be defended till pain and discomfort subside. Before adapting weight bearing condition orthotic support or walking aid must be provided to relieve from compressive forces on the affected joints. Job oriented performance should be included in the exercise program.

References:

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