
RHEUMATOID ARTHRITIS: RECENT ADVANCES IN DIAGNOSIS AND TREATMENT

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ABSTRACT

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune inflammatory disorder that primarily affects the joints and can lead to progressive cartilage destruction, bone erosion, deformity, and functional disability. Early diagnosis and appropriate treatment are essential to control disease activity and prevent irreversible joint damage. Diagnosis is based on clinical manifestations, physical examination, laboratory tests, and imaging techniques. Recent advances in diagnosis include rheumatoid factor (RF), anti-cyclic citrullinated peptide (anti-CCP) antibodies, inflammatory biomarkers, ultrasonography, and magnetic resonance imaging (MRI), which may facilitate earlier detection of joint inflammation and structural changes.

The treatment of RA has evolved significantly with the development of disease-modifying antirheumatic drugs (DMARDs), biologic DMARDs, and targeted synthetic DMARDs. Conventional drugs such as methotrexate, leflunomide, sulfasalazine, and hydroxychloroquine remain important treatment options, while biologic agents and Janus kinase (JAK) inhibitors provide additional options for patients with an inadequate response to conventional therapy. Advances in individualized treatment strategies and treatment-to-target approaches have improved the likelihood of achieving remission or reduced disease activity. This project reviews recent advances in the diagnosis and treatment of rheumatoid arthritis, emphasizing emerging diagnostic approaches, new therapeutic agents, their benefits, limitations, and future prospects for RA management.

KEYWORDS: rheumatoid arthritis, autoimmune disease, diagnosis, anti-CCP, biomarkers, DMRDS, biologics, JAK inhibitors, personalized medicine.

INTRODUCTION

Rheumatoid arthritis (RA) is a chronic, systemic autoimmune disease that primarily targets the synovial joints, causing inflammation, pain, swelling, and ultimately joint destruction if untreated. Unlike osteoarthritis, which results from mechanical wear and tear, RA is characterized by the immune system mistakenly attacking the body's own tissues, particularly the lining of the joints (synovium). This ongoing immune response causes the synovium to thicken, resulting in swelling, tenderness, and stiffness of the joints, and can eventually lead to bone erosion and joint deformity.

RA is not limited to the joints; It can also affect other organs and systems, including the skin, eyes, lungs, heart, and blood vessels, making it a systemic disease. The disease often manifests with symmetrical joint involvement, meaning the same joints on both sides of the body are affected. Common symptoms include persistent joint pain, stiffness (especially in the morning or after periods of inactivity), fatigue, fever, and loss of appetite. In severe cases, RA can significantly impair daily functioning and quality of life.

SYMPTOMS

Rheumatoid arthritis can affect any joint in the body, although the small joints of the hands and feet are often affected first. Both parts of the body are usually affected in the same way, at the same time. But this does not always happen. Along with joint problems, you may also experience other symptoms.

The main symptoms of rheumatoid arthritis are:

- Joint pain
- Swelling, warmth and redness in the joints, capsules and ligaments become loose.
- Stiffness, especially first thing in the morning or after sitting for a long time.
- Fatigue and lack of energy – this is known as fatigue
- loss of appetite
- weight loss
- High temperature, or fever
- sweating

DIAGNOSING RHEUMATOID ARTHRITIS

Diagnosing rheumatoid arthritis (RA) involves a comprehensive approach, including a medical history, physical examination, laboratory tests, and sometimes imaging studies. Diagnosing RA in its early stages can be challenging because the disease progresses over time, symptoms can be similar to other types of arthritis, and there is no definitive test for it.

Major Diagnostic Steps

1. Medical history: Your doctor will ask about your symptoms, including when they started, their progression, and the joints affected. They will also ask about any limitations in daily activities caused by joint pain, other medical conditions, family history of autoimmune diseases (including RA), and medications you are currently taking.

2. Physical examination: The doctor will check your joints for swelling, warmth, tenderness, and range of motion. They may also assess your ability to walk or perform daily tasks and check for rheumatoid nodules (solid lumps under the skin) or signs of inflammation in other parts of the body.

3. Laboratory tests: Blood tests are important in diagnosing RA and monitoring its activity. These tests may include:

- Erythrocyte sedimentation rate (ESR or “sed rate”): Measures the level of inflammation in the body.
- C-reactive protein (CRP): Another indicator of inflammation produced by the liver.
- Rheumatoid factor (RF): An antibody found in many people with RA, although not everyone tests positive.
- Anti-cyclic citrullinated peptide (anti-CCP) antibodies: Often present in people with RA before symptoms develop, and can help with early diagnosis.

4. Imaging studies: Imaging tests help evaluate joint damage and disease progression. These may include:

- X-ray: Useful to monitor disease progression and rule out other causes of joint pain.
- magnetic resonance

I. Blood test

There is no blood test that confirms that you have rheumatoid arthritis. However, there are some tests that can show possible symptoms of the condition. Usually, you don't have to avoid eating or drinking before these tests, but your doctor will let you know if you do.

II. Erythrocyte Sedimentation Rate (ESR): This test shows the level of inflammation in your body.

III. C-reactive protein (CRP) test: This test also helps measure inflammation in your body.

IV. complete blood count: A complete blood count can rule out other possible causes of your symptoms. The complete blood count measures how many red blood cells you have in your blood. Red blood cells carry oxygen throughout your body in your blood and if you don't have enough, you can get anemia.

Anemia is common in people with rheumatoid arthritis. But if you have anemia, it does not prove that you have rheumatoid arthritis. For example, you may have anemia because you don't have enough iron in your diet.

V. Seropositive and seronegative (rheumatoid factor and anti-CCP antibodies): If you have been diagnosed with rheumatoid arthritis, you may have been told that you are seropositive or seronegative.

If you have been told that you are seropositive, it means that one or both of the following antibodies are present in your blood:

- Rheumatoid factor (RF)
- Anti-cyclic citrullinated peptide (anti-CCP).

VI. Scan: You may also have some scans to check whether there is any swelling or damage to your joints. These include:

- X-ray: A test that makes pictures of the inside of the body. It is used to look for injuries or damage to bones or joints.
- Ultrasound scan: Uses sound waves to make pictures of the inside of the body
- Magnetic resonance imaging (MRI) scan: A scan that uses magnets to see what's happening inside your body. MRI scan may show soft-tis.

UNUSUAL SYMPTOMS OF RHEUMATOID ARTHRITIS

RA can show unusual symptoms that are difficult to recognize and require proper attention for diagnosis.: Numbness and tingling, dry eyes and mouth skin rashes, difficulty breathing and chest pain.

TREATMENT OF RHEUMATOID ARTHRITIS aims to reduce inflammation and pain, prevent joint damage, preserve function, and achieve remission or reduced disease activity.

1. Disease-modifying anti-rheumatic drugs (DMARDs)

These are the mainstay of RA treatment because they can slow or stop joint damage.

- Methotrexate – usually the traditional first-line DMARD, Hydroxychloroquine , Sulfasalazine

- Leflunomide

2. Biologic DMARDs: It is used when traditional DMARDs do not adequately control the disease.

- TNF inhibitors: Adalimumab, Etanercept, Infliximab
- Tocilizumab – IL-6 receptor inhibitor • Abatacept – T-cell costimulation modulator
- Rituximab – B-cell-depleting therapy

3. Targeted Synthetic DMARDs : • Tofacitinib , Bericitinib , Upadacitinib

These are JAK inhibitors and require clinical monitoring for important safety reasons

4. NSAID: Primarily used for short-term relief from pain and stiffness; They do not prevent joint destruction.

Example:• Ibuprofen, Naproxen, Diclofenac

5. Corticosteroids: Example: Prednisolone, Methylprednisolone, They can rapidly reduce inflammation and can be used for short periods or during disease flare-ups, as long-term use can cause significant adverse effects.

6. Non-pharmacological treatment: Physiotherapy and proper exercise, Occupational therapy, Maintaining a healthy weight, Joint-protection techniques, Adequate rest during acute outbreak Stopping smoking, Patient education and regular monitoring

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