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Early Detection of Rheumatoid Arthritis: Significance of Identifying Disease in the Poorvarupa Phase

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Abstract

Introduction: Rheumatoid arthritis (RA) is a chronic inflammatory autoimmune disorder. It causes ongoing inflammation in the synovial tissue, erosion of bones and cartilage, and ultimately joint destruction. In Ayurvedic texts, this condition closely resembles Amavata, which arises from the combined imbalance of Ama and Vata Dosha. Ongoing inflammation in RA results in the gradual destruction of articular cartilage and bone, leading to significant health issues and disability. However, the exact triggers of this condition are still not fully understood, making it challenging to find a definite cure. This study aims to examine the modern causes of early RA and the Ayurvedic idea of Amavata Poorvarupa. **Methods**: To address the diagnostic gap, we created a methodology that combines the modern 2010 ACR/EULAR Classification Criteria and EULAR High-Risk Parameters with the Ayurvedic Nidana Panchaka framework, focusing on Kriyakala, Nidana, and Poorvarupa. We systematically mapped the biological progression of early RA to the Ayurvedic stages of Shatkriyakala. This comparison led to the development of a 4-Step Clinical Screening Model designed to identify high-risk individuals before any permanent joint damage occurs.

Results: The main outcome of this study is the identification of Poorvarupa in the early recognition of Amavata before the disease progresses into a fully manifested stage. This model aims to close the diagnostic gap by identifying high-risk groups, a Poorvarupa checklist, and subjective neurological signs, such as the "walking on pebbles" sensation, tightness, pulling sensations, and morning stiffness. We also focused on clinical examinations that include tenderness in small joints, particularly the Metacarpophalangeal (MCP), Proximal Interphalangeal (PIP), and Metatarsophalangeal (MTP) joints, as well as objective loss of physical function. Targeted early laboratory markers include Anti-CCP (cyclic citrullinated peptide), Rheumatoid Factor (RF), and inflammatory markers such as ESR and CRP. **Discussion**: Subclinical inflammation of the synovial tissue and early cytokine release affect local biomechanics and lead to pain sensitivity before any visible swelling occurs. Early morning stiffness is a result of circadian changes in inflammation. In Ayurveda, Mandagni leads to the production of Ama, which then move to the joints. Psychological stress (Chinta, Bhaya, Krodha) weakens Agni and raises Vata Dosha, causing more joint pain, stiffness, and fatigue. Therefore, it is vital to use Satvavajaya Chikitsa to stabilize Vata and improve digestive health. Moreover, MRI imaging is often not affordable. The Ayurvedic concept of Poorvarupa provides clinical criteria to identify these subclinical cases during the crucial 3 to 6month window In this early phase, starting Nidana Parivarjana, along with Deepana and

Amapachana drugs, helps correct Agni, breaking down Ama before it causes joint damage, severe deformities. Ultimately, combining traditional Poorvarupa recognition with modern clinical measures creates a better framework for early intervention, effective disease control, and preventing complications.

Keywords: Amavata, Rheumatoid Arthritis, Poorvarupa, Agni, Kriyakala, Srotas

Introduction

In European medical literature, Guillaume Baillou, a French physician, published the first textbook on arthritis, titled Rheumatism. Later, the London physician Sir Alfred Garrod formally coined the clinical term "Rheumatoid Arthritis".

Rheumatoid arthritis (RA), a chronic inflammatory autoimmune disorder, is characterized by persistent synovial inflammation, erosion of bones and cartilage, leading to joint destruction.

Environmental and genetic factors are important contributors in its susceptibility. Despite advances in understanding, the precise initiating mechanisms and factors sustaining chronic inflammation in RA remain incompletely elucidated, limiting definitive prevention and cure.

It continues to pose a challenge to the physician due to severe morbidity and a crippling nature.

It impacts approximately 0.5% to 1.0% of the global adult population, displaying a notable female predominance (with a female-to-male ratio ranging from 3:1 to 5:1) and a peak onset characteristically occurring in the third and fourth decades of life.[1]

Concept of Amavata

Amavata is not directly mentioned in Vedic texts. Some scholars correlate Visha in the Vedas with the concept of Ama in Ayurveda. Amavata as a distinct disease entity in Madhava Nidana. Gada Nigraha mentions Vikunchana as a symptom of Amavata. Also, Vangasena describes poorvarupa and notes takra tulya mutra as a characteristic feature. In Samhita kala Amavata is not described as a separate chapter in Charaka Samhita. In Susruta Samhita nidanasthana, joint inflammation, pain and immobility are described in vatavyadhi. In Astangahridaya Amavata is not mentioned.

“Amena sahito vata Amavata”. The virulent Ama circulates in the whole body propelled by the vitiated vata doshas produce blockage in the body channels that remain in the sandhi giving rise to Amavata. [2]

Materials and Methods

Study Design

Narrative Review

Sources of Data

- Classical Ayurvedic Texts: Charaka Samhita, Susruta Samhita, Astangahridaya, Madhava Nidana, Vangasena.
- Contemporary Ayurvedic Journals and review articles on Amavata and Rheumatoid Arthritis.

Results

Early RA and Window of Opportunity

Identification of RA at initial presentation and treatment at an earlier stage can affect the disease course,

prevent the development of joint erosions, or retard the progression of erosive disease. Regarding the current concept of "window of opportunity", early diagnosis of RA is essential for initiation of treatment; otherwise, the disease will progress to more severe forms. The first phase is the period leading up to the onset of arthritis, and there is no irreversible joint damage. The second is the period during which persistence or remission is determined. Here is the window of opportunity during which early treatment can alter disease progression and prevent long-term disability. The first 3-6 months can prevent irreversible joint damage. The third and fourth phases are the evolution into a specific form of inflammatory arthritis and the outcome/severity of that arthritis. Diagnostic challenges are non-specific symptoms, overlaps with other arthritis and there are no early radiographic changes. So, missing this crucial window allows the disease to transform into a chronic, progressive phase marked by irreversible synovial erosion, cartilage degradation, and severe bone destruction.

Pathogenesis of Early RA

Certain genes (HLA DRB1) make an individual more likely to develop the disease with environmental triggers like smoking. So the body's immune system mistakenly identifies its own joint tissue as foreign, which is loss of immune tolerance. This leads to the activation of CD4+ T cells in the synovium and orchestrates the immune response. These WBC release cytokines (TNF- ALPHA, IL-1, IL-6, IFN-GAMMA) that drive the inflammatory cycle. B cells become activated in response to helper T cells and cytokines. These activated B cells produce auto-antibodies (RF, Anti CCP) that form immune complexes (RF+IgG). Immune complexes deposit in the synovium and blood vessels, activating complement and recruiting more immune cells. All these factors lead to chronic synovial inflammation (Synovitis, Cell infiltration, Hyperplasia). The inflamed synovium proliferates into pannus, which invades and damages cartilage and bone. These pannus and inflammatory mediators cause cartilage destruction and bone erosion, leading to joint damage.

So in the initial stage, the inflammation is non-specific and not yet directed specifically against the body's own tissues, but it creates the pathogenic groundwork for the later more destructive phase.[3]

Samprapti of Amavata

The process begins when an individual engages in virudha ahara and virudha vihara, snigdham buktavato vyayama and nischalatwa. This causes Agnimandhya and Vata dushti. This Agnimandhya leads to the formation of Ama. This Ama circulates throughout the dhamanis with the help of vitiated Vata. These are especially localizing in kapha sthanas and joints. It leads to Rasavaha Srotodushti and Trikasandhi pravesha and manifests symptoms such as stabdhata, sandhishoola, sandhisotha, angamardha, apaka, jwara, anga gaurava and alasya.[4]

Pathology of Musculoskeletal symptoms and Stiffness and its relevance in Early Diagnosis.

Musculoskeletal symptoms

Low-grade inflammation begins in the synovium and peri-articular tissues before visible swelling. It causes deep, ill-defined pain rather than localized joint pain. Early release of TNF-ALPHA, IL-1, and IL-6. It sensitizes peripheral nociceptors. Leads to hyperalgesia (increased pain perception) even without clear inflammation. Early tenosynovitis and enthesitis, especially in hands and feet, produce discomfort and stiffness. Patients may experience a "walking on pebbles" sensation, tightness, or pulling sensation.

Mild peri-articular muscle inflammation causes vague muscular aches and stiffness. So, these early inflammatory changes alter joint biomechanics, producing abnormal pressure sensations in small joints. These subtle musculoskeletal manifestations are important clues for early rheumatoid arthritis diagnosis.

Stiffness

Morning stiffness (MS) is a hallmark of RA and is associated with markers of systemic and local inflammation in RA patients.

Circadian Variation of Inflammation increases pro-inflammatory cytokines (TNF-ALPHA, IL-6, IL-1) in the early morning. These decrease cortisol (anti-inflammatory), which leads to increased inflammatory activity. Inflamed synovium leads to increased synovial fluid and exudate, which leads to Joint swelling and Capsular distension. Reduced joint movement during sleep, accumulation of inflammatory fluid and increased Synovial fluid viscosity, which leads to stiff, poorly lubricated joints. Fibrin forms a mesh within the joint space, which restricts smooth joint movement and causes muscle and soft tissue inflammation, which leads to stiffness.[5]

Clinical features of Early RA

The EULAR task force defined seven clinical parameters to identify those at high risk of progressing to RA:

1. **Symptom Duration of < 1 Year**
   The "window of opportunity" suggests that treatment within the first 3 to 6 months can fundamentally alter the disease's trajectory.
2. **Symptoms Located in the MCP Joints**
   The Metacarpophalangeal (MCP) joints are the "hallmark" of RA. Tenderness or pain specifically localized here is a red flag.
3. **Duration of Morning Stiffness > 60 min**
   In RA, the overnight accumulation of inflammatory cytokines (IL-6 in particular) and edema in the synovium requires significant movement and "washout" time to resolve.
4. **Most Severe Symptoms in the Early Morning**
   Pro-inflammatory cytokine levels peak in the early morning hours (3:00 AM – 6:00 AM) while endogenous cortisol levels are still relatively low. This creates a peak of pain and stiffness upon waking.
5. **Presence of a First-Degree Relative with RA**
   Genetics (specifically the HLA-DRB1 "shared epitope") account for about 20-50% of the risk for RA.
6. **Difficulty Making a Full Fist**
   If a patient cannot tuck their fingernails into their palm, it suggests inflammatory volume expansion in the hand.
7. **Positive Squeeze Test of the MCP Joints**
   The clinician squeezes across the row of MCP joints (or MTPs in the feet). In early RA, the "boggy" inflamed synovium is exquisitely sensitive to this lateral pressure.

Early RA Diagnosis Simplified: 2010 ACR/EULAR Approach

The 2010 ACR/EULAR Classification Criteria are standardized diagnostic guidelines developed by the American College of Rheumatology (ACR) and the European Alliance of Associations for Rheumatology

to identify rheumatoid arthritis (RA).
These criteria focus on the early detection and classification of RA to facilitate prompt treatment and consistency in research.

Clinical Significance

The 2010 criteria revolutionized RA diagnosis by prioritizing immunologic and inflammatory features over chronicity and deformity. They support earlier initiation of disease-modifying anti-rheumatic drugs (DMARDs), improving long-term outcomes and enabling uniform patient selection for clinical trials.[6]

Joint Involvement (0–5 points)

Joint involvement	Score
1 large joint	0
2–10 large joints	1
1–3 small joints	2
4–10 small joints	3
>10 joints (at least 1 small joint)	5

Serology (0–3 points)

Test	Score
RF & Anti-CCP negative	0
Low-positive RF or Anti-CCP	2
High-positive RF or Anti-CCP	3

Acute Phase Reactants (0–1 point)

Test	Score
Normal CRP & ESR	0
Abnormal CRP or ESR	1

Duration of Symptoms (0–1 point)

Duration	Score
< 6 weeks	0
≥ 6 weeks	1

Diagnosis of RA requires ≥ 6 or 10 points

- **Interpretation**

≥6 points → Classified as RA
<6 → Not classified (but may still evolve into RA)

Challenges in Early RA Diagnosis

The limitations are there is low sensitivity for early disease. There is no single definitive diagnostic test

capable of identifying the pathology in its initial stages. Conventional radiography exhibits poor early detection capabilities. Consequently, classic features such as marginal bone erosions only appear in advanced stages of the disease.

Due to nonspecific initial manifestations that often overlap with other inflammatory arthritides, such as undifferentiated arthritis. Patients typically present with mild synovitis, joint pain, and stiffness, making a definitive diagnosis difficult at onset.[7]

Ayurvedic Framework for Early Detection

Ayurvedic diagnostics prioritize identifying a disease process during its early, subclinical stages using the Nidana Panchaka (Nidana, Poorvarupa, Rupa, Upasaya, Samprapti) and Pariksha (clinical examination).

Clinical Significance of the Poorvarupa Phase

Poorvarupa helps in early intervention, thereby preventing disease progression.

According to Acharya Vagbhata, premonitory signs indicate an impending illness but do not specifically reveal which doshas are involved in its pathogenesis (Samprapti).

Understanding poorvarupa assists in sadhya asadhya, roga nirnaya, vyavachedaka nidana and chikista.

Interpretation of Poorvaroopa along with other components of Roga Pariksha, such as Nidana and Upashaya, is essential for early identification of disease, prevention of Samprapti progression, and avoidance of disease complications.[8]

Aacharya Vangasena mentioned Siro ruja and Gaatra ruja as poorvarupa of Amavata.

In Amavata, aggravation of Vata along with Ama affects the body and Shira, producing symptoms such as severe joint pain, stiffness, restricted movements, Shiroruja, Gaurava, Angamarda, and fatigue.

Srotorodha by Ama and Vata Vaigunya can alter pain perception and neuromuscular coordination, leading to diffuse musculoskeletal and neurological symptoms.

Poorvarupa appears during the stage of Dosha-Dushya Sammurchhana, corresponding to the fourth stage of Shatkriyakala, known as Sthanasamshraya Avastha, where the disease process begins to localize in specific tissues or organs. Here we can consider sthanasamsraya happens in Siras and Gaatra.

The combined physiological inflammation and neurological involvement in Amavata contribute to symptoms such as pain sensitization, fatigue, stiffness, and altered sensory perception.

Samanya Lakshana of Amavata

Angamardha, Aruchi, Trishna, Alasya, Gaurava, Jwara, Apaka, Soonata anganaam.

Pratyatmarupa, according to Anjana Nidanam, are: Sandhishoola, Sandhi sotha, Stabdhata, Sparsha asahatva.

An integrated approach of RA and Amavata

Step 1: Identify High-Risk Individuals

Screen patients with: Family history of RA, Female gender (30-50 years), History of Autoimmune disorders, Consumption of Virudha Ahara and Indulging Viruddha Chesta.

Step 2: Poorvarupa checklist

Gaatra ruja, Siro ruja

Most presenting features like: Angamardha, Aruchi, Alasya, Apaka, Anga gaurava, Shotha.
Sadhya-Ekadosha: One dosha involved. Yapya-Two doshas are involved. Asadhya-All doshas are involved, and if inflammation is all over the body.
Step 3: Clinical Examination
Tenderness in small joints (MCP, PIP, MTP), Mild swelling, decreased grip strength, Squeeze test (MCP/MTP tenderness).
Step 4: Early Laboratory Screening
Anti-CCP- most important early marker, RF, ESR & CRP.

Discussion

Kriyakala Progression

Sanchaya & Prakopa: When a person is exposed to etiological factors like Viruddha Ahara, does vyayama after intake of snigdha ahara, chinta, krodha etc, Agnimandya leading to tridosha dushti & Ama utpatti in the Sanchaya & Prakopa avastha.
Prasara: With the help of Vata, this Ama undergoes prasara to the shleshma sthana, producing mild sandhishoola, etc., along with Ama symptoms.
Sthana Samshraya: This prasarita Ama, which endures sthana samshrya in Hridaya, Trika sandhi & Sarvanga, leading to Dosha-Dushya sammurchana.
Vyakti: As it reaches Vyakta avastha, most of the symptoms of Amavata are manifested.
Bheda: In chronic stage – producing updravas like sankocha, khanjata (pravridha amavata lakshana).
The initial stages, Sanchaya and Prakopa helps in recognizing early symptoms of Ama and Vata Dosha imbalance.
Early detection allows for timely lifestyle and dietary adjustments, effectively stopping disease progression and reducing the risk of chronic joint pain and damage.[9]

Challenges in Early Diagnosis of RA

- Seronegative gap: In the early stages of Rheumatoid Arthritis (RA), a significant diagnostic challenge exists as approximately 20% to 30% of patients are RF and Anti-CCP negative.
- Limited sensitivity: While the Anti-CCP assay offers high diagnostic specificity for the disease, but only moderate sensitivity.
- Non-specific markers: Acute-phase reactants, such as ESR and CRP, function as non-specific markers that can be elevated in many inflammatory conditions.
- Imaging Limitations: MRI is clinically limited because it is expensive and less accessible to the general patient population.
- Diagnostic overlap: Differential diagnosis is further complicated, as early RA frequently mimics the clinical presentations of other conditions like psoriatic arthritis, Systemic Lupus Erythematosus (SLE), and various viral arthritides.
- Delayed diagnosis: Widespread patient unawareness and inherent diagnostic difficulties frequently delay an accurate diagnosis.[10]

Ayurvedic Integrated Care Approach

Mental stress and emotional factors aggravate vata and weaken agni, leading to ama formation. A disturbed mental state may increase pain, stiffness, and fatigue in amavata. Mental calmness such as

satvavajaya chikista and yoga- based supportive therapy helps in stabilizing vata, improving agni, preventing disease progression and enhancing quality of life.

Conclusion

Awareness of early symptoms such as morning stiffness, small joint pain, fatigue, and joint swelling promotes timely medical consultation and facilitates early diagnosis of Rheumatoid Arthritis. Prompt rheumatology consultation and timely therapeutic intervention help achieve better disease control, reduce disease progression, and prevent irreversible joint damage within the therapeutic window of opportunity.
"Early correction of Agni and prevention of Ama help arrest the progression of Amavata by clearing the Srotas before irreversible joint deformity and functional impairment develop."
Nidana Parivarjana such as incompatible diet, sedentary lifestyle, and improper food habits plays a significant role in preventing disease manifestation, progression, and recurrence. Identification of Poorvarupa aids in the early recognition of Amavata before the disease progresses into a fully manifested stage. Poorvarupa, along with the other components of Nidana Panchaka, holds significant importance in Roga Pariksha for the diagnosis and early identification of diseases.
Thus, understanding the significance of early detection in rheumatoid arthritis along with the Poorvaroopa concept of Amavata may provide better opportunities for early intervention, disease control, and prevention of complications.

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