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Integrative Ayurvedic Management of Metabolic Disorder with Autoimmune Comorbidity: A Case Study

Rathee N.[1], Adiga M.[2]

1. PG Scholar, Department of PG Studies in Kayachikitsa, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Centre, Vijayanagar, Bengaluru.
2. HOD and Professor, Department of PG Studies in Kayachikitsa, Sri Kalabyraveshwara Swamy Ayurvedic Medical College, Hospital and Research Centre, Vijayanagar, Bengaluru.

ABSTRACT: Introduction: Metabolic disorders constitute a heterogeneous group of conditions arising from disturbances in carbohydrate and lipid metabolism, commonly presenting as obesity, type 2 diabetes mellitus, dyslipidaemia, and hypertension. These disorders frequently coexist with autoimmune diseases such as rheumatoid arthritis due to shared mechanisms including chronic inflammation, oxidative stress, and immune dysregulation. Conventional long-term pharmacological management often leads to polypharmacy with limited improvement in overall quality of life. Ayurveda offers a holistic and individualized approach by correcting impaired metabolic function (*Agnimandya*), eliminating metabolic toxins (*Ama*), and restoring *Dosha–Dhatu–Mala* balance, thereby addressing the root pathology in complex multisystem disorders. **Aim and Objectives:** To evaluate the role of integrative Ayurvedic management in achieving metabolic balance, reducing drug dependency, and improving quality of life in a patient with metabolic disorder and autoimmune comorbidity. **Materials and Methods:** A 44-year-old female with obesity, type 2 diabetes mellitus, hypothyroidism, hypertension, and RA underwent integrative Ayurvedic management for five months, including *Panchakarma* therapies, *Shamana* and *Rasayana* medications, diet and lifestyle modification, alongside essential allopathic medications. **Results:** Significant improvement was observed in body weight, BMI, glycaemic status, thyroid profile, joint pain, stiffness, and energy levels. Reduction and discontinuation of antidiabetic drugs, analgesics, hydroxychloroquine, and DMARDs were achieved under medical supervision. WHOQOL-BREF and RAPID-3 scores showed marked improvement. **Conclusion:** Integrative Ayurvedic management effectively complemented conventional therapy in a complex metabolic–autoimmune condition by correcting *Agni*, *Ama*, and *Medodoshaja* pathology, reducing polypharmacy and improving quality of life.

KEYWORDS: Metabolic disorder, Integrative Ayurveda, Rheumatoid Arthritis, *Amavata*, *Agni*, *Ama, Panchakarma.*

CORRESPONDING AUTHOR:

Dr. Nikita Rathee

PG Scholar, Department of PG Studies in Kayachikitsa,
Sri Kalabyraveshwara Swamy Ayurvedic Medical College,
Hospital and Research Centre, Vijayanagar, Bengaluru.
Email- nikitarathee25011@gmail.com Mobile no: - 7015481142

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INTRODUCTION:

Metabolic disorders refer to a heterogeneous cluster of chronic conditions resulting from derangements in carbohydrate, lipid, protein, and mineral metabolism, characterized by impaired glucose regulation, dyslipidaemia, obesity, hypertension, and insulin resistance, collectively increasing cardiovascular and inflammatory disease risk[1]. Type 2 diabetes mellitus (T2DM) is defined as a chronic metabolic disease characterized by persistent hyperglycemia due to insulin resistance and relative insulin deficiency[2]. Obesity is described as excessive accumulation of body fat associated with increased morbidity and mortality, commonly assessed using body mass index (BMI)[3]. Dyslipidemia refers to abnormal serum lipid levels, particularly elevated low-density lipoprotein cholesterol and triglycerides, contributing to systemic inflammation and atherogenesis[4]. Rheumatoid Arthritis (RA) is a chronic autoimmune inflammatory disorder primarily affecting synovial joints, leading to pain, stiffness, progressive joint destruction, and systemic complications[5]. The coexistence of metabolic disorders and RA is well documented and reflects a complex metabolic–endocrine–inflammatory interplay, mediated through shared mechanisms such as chronic low-grade inflammation, oxidative stress, altered cytokine profiles, immune dysregulation, and mitochondrial dysfunction[6]. Clinical evidence suggests that obesity, insulin resistance, and dyslipidemia not only increase the risk of RA but also worsen disease activity and therapeutic outcomes. Conventional management of such multisystem involvement relies on long-term use of antidiabetic agents, statins, antihypertensives, corticosteroids, and disease-modifying antirheumatic drugs (DMARDs). Although these therapies effectively control disease parameters, prolonged use of drugs such as metformin, statins, methotrexate, and hydroxychloroquine is associated with adverse effects including gastrointestinal intolerance, hepatotoxicity, myopathy, bone marrow suppression, and increased susceptibility to infections[7–9]. This often results in polypharmacy with limited improvement in overall quality of life. Ayurveda explains such multisystem involvement through *Agnimandya* (*impaired metabolic fire)*, *Ama utpatti (formation of metabolic toxins)*, *Kapha–Meda dusti (vitiation of bio-structural and adipose components),* and secondary *Vata prakopa (aggravation of bio-functional principle)*, ultimately manifesting as conditions such as *Prameha (metabolic disorders including diabetes)* and *Amavata (autoimmune inflammatory joint disorder)* [10–12]. Hence, Ayurveda emphasizes a holistic and individualized therapeutic approach aimed at correcting *Agni*, eliminating *Ama*, and restoring *Dosha–Dhatu–Mala* equilibrium, rather than merely suppressing isolated symptoms

Aim and Objectives

Aim:

To evaluate the role of integrative Ayurvedic management in improving clinical outcomes and quality of life in a patient with metabolic disorder and autoimmune comorbidity.

Objectives:

- To assess improvement in metabolic and inflammatory parameters
- To evaluate reduction in joint symptoms and disease activity
- To observe reduction in dependency on long-term allopathic medications
- To assess improvement in quality of life.

Materials and Methods

Study Design

Single-patient observational case study.

Patient Demographics

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- Age: 45 years
- Gender: Female
- Occupation: Housewife
- Marital Status: Married

Chief Complaints

- Pain in multiple joints with early morning stiffness for 1.5 years
- Increased blood glucose levels for 4 years with numbness in lower limbs
- Reduced appetite for 2 years
- Hair fall and facial puffiness for 4 years

Past Medical History

- Hypothyroidism – 25 years
- Type 2 Diabetes Mellitus – 4 years
- Hypertension – 4 years
- Rheumatoid Arthritis – 3 years
- Hyperlipidaemia – 2 years

Personal History

- Diet: Mixed
- Appetite: Reduced
- Bowel: Regular (once daily)
- Micturition – 6-7 times/day
- Sleep: Sound
- Tongue: coated

Medication History

Patient was on Thyroxine, Metformin, Methotrexate, HCQ, antihypertensive, statins, aspirin, and vitamin supplements.

Clinical Examination

- BMI: 34.7 kg/m^2
- BP: 140/90 mmHg
- Multiple joint tenderness, warmth, and swelling (bilateral involvement)
- Cardiovascular, respiratory, and neurological examinations were found to be normal.

Investigations

(Table -1- investigations done on different follow-up periods)

Parameter	19/11/2023	18/09/2024	25/04/2025	26/10/2025
FBS	150	130 mg/dl	97 mg/dl	110 mg/dl
PPBS	200	158 mg/dl	100 mg/dl	130 mg/dl
HbA1C		6.68 %	6.69 %	6.6%
CRP	3.1 mg/L		Negative	Negative
ESR	33 mm/hr		30 mm/hr	25 mm/hr
RA Factor	42.3 IU/ml		40 UI/mL	49.8 UI/ml
S. Uric Acid				3.9 mg/dl
Total Cholesterol	320 mg/dl	300 mg/dl	247 mg/dl	235.1 mg/dl
TSH			1.110 mcIU/ml	1.25 mcIU/ml

Treatment Protocol

(Table -2 - Detailed treatment with procedures, oral medications, and follow-up improvements)

Date	Treatment	Oral Medications	Improvements
13/03/2025 to 27/03/2025	Sarvanga Udwartana with Triphala churna	Dashamoola Kwatha 100ml OD in empty stomach	• Pain in multiple joints-reduced – 80%

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	+ Kolakulathadi Churna Mrudu Bashpa Sweda Vaishwanara Churna Basti * 8 days		• Early Morning stiffness – reduced from 1.5 hrs to 30 mins. • Appetite – improved • Alasya, tandra, jwara, gaurava, angamarda, Trishna – reduced 70%
28/03/2025 to 20/03/2025		Nirgundi ghana Vati 2-2-2 Dashamoola kwatha 100ml OD	• Pain reduced by 90% • Early morning Stiffness – reduced to 15-20 mins • Tandra,Gaurava,Dourbalya – reduced completely • RAPID 3 score reduced from 20 to 7.
21/04/2025 to 27/05/2025		Shiva Gutika 2-0-0 (empty stomach) Guduchi churna – ¾ Spoon + Shunthi Churna – ¼ Spoon – Ksheerapaka	• Metformin dose reduced to half. (500mg-0-500mg) • Stopped HCQ, Methotrexate • Alasya, Tandra, Jwara, Gaurava, Angamarda, Trishna, Prabhuta Mutrata,Aavila Mutrata, Karapada Tala daha, Karapada tala Suptata, Dourbalya – reduced completely
28/05/2025 to 9/07/2025		Shiva Gutika 2-0-0 (empty stomach) Guduchi churna – ¾ Spoon + Shunthi Churna – ¼ Spoon – Ksheerapaka BD 20ml Guru Rasayana 1-0-1	• Metformin Dose reduced to 250mg-0-500mg
9/07/2025 to 09/09/2025		Shamshamani Vati 2-0-2 Dashamoolarishta 30ml BD	• Jwara, Angamarda, tandra, Gaurava, alasya – reduced 60%
10/09/2025 to 23/09/2025		Cap. Palsineuron 1-1-1 Dashamoolarishta 30ml BD Ksheerabala 101 2drops as Nasya	• Reduced 50%
24/09/2025 to 8/10/2025		Amruthadi Guggulu 1-1-1 Dashamoolarishta 30ml BD	• Reduced – 70%
9/10/2025 to 11/10/2025	Snehapana with Mahatiktaka Ghrita		

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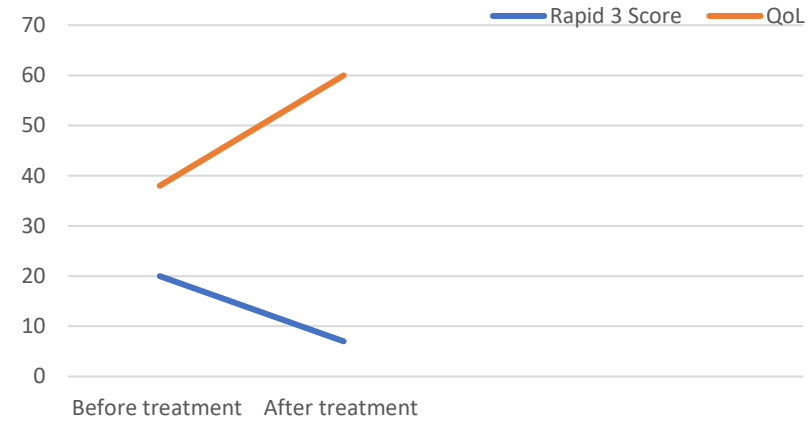
12/10/2025 to 14/10/2025	Vishramakala Sarvanga Abhyanga with Moorchita tila taila		
15/10/2025	Virechana with Trivrit lehya – 70 gms	Total vegas – 11	• Pain in right forearm & elbow – reduced 80 % • Early morning stiffness – reduced 70% • Heaviness, numbness & tingling sensation in palms & soles – reduced completely • QoL – BT-38 to AT -60

Fig.1- Changes in scoring scales after treatment



Results

The patient demonstrated progressive improvement in metabolic parameters, inflammatory markers, and functional capacity. Glycemic control improved with reduction in FBS, PPBS, and HbA1c. Lipid profile showed a declining trend. ESR reduced and CRP became negative. RAPID-3 score reduced from 20 to 7, and WHOQOL score improved from 38 to 60. Under medical supervision, doses of metformin, antihypertensives, HCQ, methotrexate, and analgesics were reduced or discontinued.

DISCUSSION:

The clinical presentation in this case reflects *Agnimandya–Ama utpatti–Srotorodha* sequence with predominance of *Kapha* and *Vata dosha*, affecting *Meda dhatu* and *Rasa–Rakta vaha srotas*, eventually manifesting as a metabolic disorder with autoimmune overlap. Classical texts describe *Prameha* and related metabolic states as conditions originating from deranged *Jatharagni* and *Medodhatvagni*, leading to excessive production of *Ama* and pathological accumulation of *Kapha* and *Meda*, which further obstructs normal *Vata gati* and tissue metabolism. [10-11] This *samprapti* provided the rationale for adopting a *Shodhana–Shamana–Rasayana* based integrative approach. Modern medicine explains metabolic syndrome as a state of chronic low-grade inflammation driven by insulin resistance, central obesity, dyslipidemia, and mitochondrial dysfunction. Excess adipose tissue acts as an active endocrine organ,

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releasing pro-inflammatory cytokines such as TNF-α, IL-6, and resistin, which impair insulin signaling and promote systemic inflammation. Persistent oxidative stress further damages pancreatic β-cells and vascular endothelium, worsening metabolic dysregulation. Autoimmune diseases like rheumatoid arthritis share similar pathogenic pathways, characterized by immune dysregulation, loss of self-tolerance, and sustained cytokine-mediated inflammation. Increased production of reactive oxygen species (ROS) and imbalance between pro- and anti-inflammatory cytokines perpetuate tissue injury and disease progression. Hence, therapeutic interventions targeting oxidative stress, inflammatory cytokines, immune modulation, and metabolic stabilization are considered central to disease control and improvement in quality of life. Initial *Shodhana* measures such as *Sarvanga Udvartana* and *Mṛudu Sweda* were employed to do the *Pravilapana* (liquification) and *Vimlapana* (destroying) of the excess *Kapha* and *Meda* accumulated.[12] It also enhances peripheral circulation, and improve insulin sensitivity. Studies have shown *Udvartana* to be effective in reducing BMI, lipid levels, and inflammatory markers[13] and regular *Udvartana* may reduce serum leptin levels and improve adiponectin balance, thereby positively influencing metabolic homeostasis. Additionally, reduction in systemic low-grade inflammation through improved circulation and detoxification aligns with the concepts of *Ama nirharana* and *Srotoshodhana*. *Basti* therapy, being the prime treatment for *Vata*, helped in breaking the *Ama–Vata sammurchana*, resulting in early relief in joint pain and stiffness[14] *Vaishwanara churna Basti* acts by correcting *Agnimandya* (poor digestive and metabolic fire) and regulating *Apana Vata*, which is central to metabolic and inflammatory disorders. Research and clinical observations suggest that *Basti* therapy improves gut metabolism, reduces systemic inflammation, and enhances insulin sensitivity by modulating the gut–immune–metabolic axis. In this case, *Basti* supported better digestion, reduced toxin (*Ama*) load, and contributed to overall metabolic balance.[15] *Shamana aushadhis* like *Dashamula Kwatha* does *Amapachana* and *vedanaharan.* It exerts anti-inflammatory, analgesic effects which are supported by experimental evidence showing inhibition of pro-inflammatory cytokines[16]. *Nirgundi Ghana Vati* is well documented for its analgesic and anti-arthritic properties, particularly in musculoskeletal disorders[17].

Immunomodulation and metabolic correction were achieved using *Guduchi*-based formulations, including *Samshamani Vati*, which has demonstrated immune-regulatory, antipyretic, and anti-inflammatory actions through modulation of macrophage and cytokine activity[18]. *Shiva Gutika* and *Rasayana* therapy improved *Dhatvagni*, enhanced *Ojas*, and supported long-term disease control, correlating with studies showing improved insulin sensitivity and antioxidant status[19]. *It* is a classical *Rasayana* formulation indicated in conditions of *Agnimandya (impaired metabolism), Ama sanchaya (toxin accumulation)*, and *Kapha–Vata dusti*. It acts by restoring *Jatharagni* and *Dhatvagni (tissue metabolic activity),* thereby reducing *Ama* formation and improving *Medovaha srotas* function. Experimental studies on its key constituents-*Guduci* (*Tinospora cordifolia*), *Haritaki* (*Terminalia chebula*), *Amalaki* (*Emblica officinalis*), *Pippali* (*Piper longum*), and *Suṇthi* (*Zingiber officinale*)-have demonstrated antioxidant, anti-inflammatory, hypoglycemic, lipid-lowering, and immunomodulatory effects. *Shilajatu* has a high **ORAC (Oxygen Radical Absorbance Capacity)** value, which means it is a strong antioxidant and helps neutralize

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harmful free radicals in the body. By reducing oxidative stress-a key factor in insulin resistance and autoimmune inflammation- it supports better insulin action and protects cells from damage. These actions collectively improve insulin sensitivity, reduce oxidative stress and inflammatory cytokines, and support immune regulation. In the present case, *Shiva Gutika* likely contributed to metabolic stabilization and immune balance, facilitating symptom control and reduction in long-term drug dependency. Definitive *Shodhana* with *Snehapana* and *Virechana* eliminated residual *Ama* and *Pitta*, resulting in sustained symptom relief, reduction in disease activity, and improvement in quality of life. The integrative approach facilitated gradual withdrawal of long-term allopathic medications, minimizing drug-related adverse effects and highlighting Ayurveda's role in reducing polypharmacy.

CONCLUSION:

This case study highlights the beneficial role of integrative Ayurvedic management in a patient with metabolic disorder and autoimmune comorbidity. Correction of *Agnimandya*, reduction of *Ama*, and normalization of *Medodosha* through *Shodhana*, *Shamana*, and *Rasayana* therapies resulted in improved metabolic control, reduction in inflammatory symptoms, and enhanced functional capacity. Significant improvement in quality of life, as reflected by RAPID-3 and WHOQOL-BREF scores, was observed alongside objective laboratory improvements. Importantly, the integrative approach supported gradual reduction of conventional medications under medical supervision without disease flare. This case suggests that Ayurveda, when used as an adjunct to modern medicine, can improve overall well-being, reduce symptom burden, and enhance quality of life in chronic metabolic and autoimmune conditions.

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