International Journal of Contemporary Research In Multidisciplinary

Research Article

Management of Dyslipidemia and Hypertension (Raktabharadhikyata) Through Medhya Rasayana Formulations: A Clinical Integrative Approach to Lipid Profile Improvement and Cardiovascular Risk Prevention

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DOI: https://doi.org/10.5281/zenodo.20964570

Abstract

Background: Dyslipidemia and hypertension constitute the twin pillars of cardiovascular risk in modern epidemiology. In classical Ayurvedic medicine, hypertension corresponds to the concept of Raktabharadhikyata (excess pressure of blood), while dyslipidemia may be correlated with impaired Meda Dhatu (lipid tissue) metabolism arising from aggravated Kapha and vitiated Vata.

Objective: This case study examines the clinical management of a 52-year-old male patient presenting with primary hypertension and mixed dyslipidemia, using a structured regimen of Medhya Rasayana formulations over a 16-week period. Methods: Standardised Ayurvedic formulations including Ashwagandha (Withania somnifera), Brahmi (Bacopa monnieri), Guduchi (Tinospora cordifolia), and Arjuna (Terminalia arjuna) were administered alongside dietary modifications and Panchakarma procedures.

Results: Significant improvements were observed in total cholesterol, LDL, HDL, and blood pressure parameters.

Conclusion: Medhya Rasayana formulations offer a holistic, evidence-aligned approach to managing cardiometabolic risk with minimal adverse effects.

Manuscript Information

- **ISSN No:** 2583-7397
- **Received:** 12-05-2026
- **Accepted:** 25-06-2026
- **Published:** 27-06-2026
- **IJCRM:**5(3); 2026: 1217-1221

- **Plagiarism Checked:** Yes
- **Peer Review Process:** Yes

How to Cite this Article

Raut A N. Management of Dyslipidemia and Hypertension (Raktabharadhikyata) Through Medhya Rasayana Formulations: A Clinical Integrative Approach to Lipid Profile Improvement and Cardiovascular Risk Prevention. Int J Contemp Res Multidisc. 2026;5(3):1217-1221.

Access this Article Online

www.multiarticlesjournal.com

KEYWORDS: Raktabharadhikyata, Dyslipidemia, Hypertension, Medhya Rasayana, Ashwagandha, Arjuna, Cardiovascular Risk, Ayurveda, Lipid Profile

1. INTRODUCTION

Cardiovascular disease (CVD) remains the leading cause of morbidity and mortality globally, with dyslipidemia and hypertension serving as its most pervasive modifiable risk factors. According to the World Health Organization, over 1.28 billion adults worldwide suffer from hypertension, and approximately 40% of adults in developing nations present with some form of dyslipidemia. Together, these conditions synergistically accelerate atherosclerosis, increase the risk of myocardial infarction, and contribute to stroke burden. Contemporary pharmaceutical management — primarily statins, ACE inhibitors, and calcium channel blockers — while effective, is often associated with long-term side effects including hepatotoxicity, myopathy, persistent dry cough, and electrolyte imbalance, reducing patient compliance over time.

Ayurveda, India's ancient system of personalized medicine, conceptualizes cardiovascular pathology through the framework of Dhatu (tissue) balance, Dosha (humoral) equilibrium, and Srotas (channel) integrity. Hypertension, in Ayurvedic nosology, is understood primarily as Raktabharadhikyata — literally, "excess pressure within blood" — arising from the interplay of aggravated Vata disturbing cardiac channels (Hridaya Srotas) and excess Pitta inflaming the vessels. Dyslipidemia, meanwhile, reflects pathological accumulation of Meda Dhatu (adipose/lipid tissue) due to impaired Agni (digestive fire) and Kapha dominance, producing what classical texts describe as Medoroga.

Medhya Rasayanas — a specific category of Ayurvedic rejuvenative formulations — have historically been documented for their neuroprotective and adaptogenic properties. Emerging pharmacological research now reveals their broader cardioprotective, lipid-regulating, and antihypertensive potential. This case study presents a structured, 16-week clinical observation of a patient with co-existing hypertension and dyslipidemia managed primarily through Medhya Rasayana protocols, supported by dietary counselling and selected Panchakarma interventions.

2. Patient Profile and Clinical Presentation

2.1 Patient Demographics

The patient, referred to hereafter as Patient A, is a 52-year-old male software professional residing in an urban setting. He presented to the integrative medicine outpatient department with complaints of persistent fatigue, occasional morning headaches, mild breathlessness on exertion, and heaviness in the chest, spanning approximately eight months prior to consultation. He had no prior history of myocardial infarction or stroke.

2.2 Conventional Medical History

Patient A had been diagnosed with Grade 1 hypertension (blood pressure: 148/94 mmHg on three separate readings) by his general physician eighteen months prior. He was prescribed Amlodipine 5 mg once daily, which partially controlled his blood pressure. A routine lipid panel conducted six months prior revealed the following: Total Cholesterol — 238 mg/dL; LDL-C — 162 mg/dL; HDL-C — 38 mg/dL; Triglycerides — 196 mg/dL. He was advised a statin (Atorvastatin 10 mg) but declined due to concerns about long-term liver effects. He sought Ayurvedic consultation as an alternative.

2.3 Ayurvedic Constitutional Assessment

Upon classical Prakriti (constitution) assessment, the patient was determined to have a Vata-Kapha dominant constitution (Dvandvaja Prakriti). Pulse diagnosis (Nadi Pariksha) revealed a tense, full quality at the Vata position with sluggishness at the Kapha level, consistent with Raktabharadhikyata and Medovridhi. Tongue examination showed mild pallor with a white coat at the base, suggestive of Ama (metabolic endotoxin) accumulation. Dietary inquiry confirmed excessive consumption of processed foods, sedentary occupation, irregular meal timing, and habitual late-night eating — classical triggers for Agni Mandya (metabolic hypofunction).

2.4 Baseline Investigations

Table 1: Baseline Clinical Parameters of Patient A at Presentation

Parameter	Baseline Value	Reference Range	Status
Blood Pressure (Systolic)	148 mmHg	< 120 mmHg	Elevated
Blood Pressure (Diastolic)	94 mmHg	< 80 mmHg	Elevated
Total Cholesterol	238 mg/dL	< 200 mg/dL	High
LDL Cholesterol	162 mg/dL	< 100 mg/dL	Very High
HDL Cholesterol	38 mg/dL	> 40 mg/dL	Low
Triglycerides	196 mg/dL	< 150 mg/dL	Borderline High
Fasting Blood Glucose	102 mg/dL	70–99 mg/dL	Prediabetic Range
BMI	27.4 kg/m²	18.5–24.9 kg/m²	Overweight
Hs-CRP	3.2 mg/L	< 1.0 mg/L	High Risk

3. Therapeutic Protocol: Medhya Rasayana Formulations

The treatment protocol was designed following classical Ayurvedic principles, with contemporary pharmacological evidence guiding herb selection. The regimen was divided into three phases over 16 weeks: Shodhana (purificatory phase, Weeks 1–3), Shamana (palliative herbal phase, Weeks 4–14), and Rasayana (rejuvenative consolidation, Weeks 15–16).

3.1 Phase I — Shodhana (Purification, Weeks 1–3)

To address the underlying Ama and prepare the channels for Rasayana absorption, a gentle Panchakarma protocol was initiated:

- **Snehana (Oleation):** Internal administration of *Mahatikta Ghrita* (medicated ghee) at 20 mL per day on an empty stomach for seven consecutive days to lubricate the channels and mobilize lipid-soluble toxins.

- **Swedana (Sudation):** Steam therapy (*Bashpa Sweda*) for 20 minutes daily for seven days, facilitating peripheral vasodilation and toxin elimination through the skin.
- **Virechana (Therapeutic Purgation):** On Day 8, *Trivrit Lehyam* (10 g) was administered, producing controlled purgation to cleanse the gastrointestinal *Pitta* seat. Three sessions were completed on alternate days.

3.2 Phase II — Shamana / Medhya Rasayana Core Protocol (Weeks 4–14)

Following purification, the primary herbal formulation regimen was initiated. Each herb was selected based on classical indications and corroborated by peer-reviewed pharmacological studies:

3.2.1 Ashwagandha (Withania somnifera)

Ashwagandha root extract standardised to 5% withanolides was administered at 500 mg twice daily with warm milk after meals. Pharmacologically, withanolides exert cortisol-lowering effects via HPA axis modulation, directly reducing stress-induced vasoconstriction and sympathetic over-activation — a key driver of Vata-mediated Raktabharadhikyata. Multiple randomized trials confirm its ability to reduce systolic blood pressure by 8–15 mmHg in stressed populations. Additionally, Ashwagandha has demonstrated statistically significant reductions in total cholesterol (up to 12%) and LDL-C (up to 10%) alongside an increase in HDL-C in clinical settings.

3.2.2 Brahmi (Bacopa monnieri)

Brahmi extract (300 mg standardized to 55% bacosides) was administered once daily in the morning with water. As a classical Medhya Rasayana, Brahmi is documented in the Charaka Samhita as a supreme herb for intellect and nerve nourishment. Contemporarily, it demonstrates ACE-inhibitory activity and direct endothelial nitric oxide synthase (eNOS) upregulation, resulting in improved vasodilation and reduced peripheral vascular resistance. Its role in this case was primarily to address the Vata component of hypertension and to reduce the anxiety-mediated sympathetic load observed in Patient A.

3.2.3 Guduchi (Tinospora cordifolia)

Stem extract of Guduchi (500 mg twice daily) was chosen for its potent Ama-digesting (Amapachana) and Kapha-reducing properties. Phytochemical analysis reveals berberine-class alkaloids and tinosporin as active constituents that modulate HMG-CoA reductase activity — the same enzyme targeted by statins — thereby reducing endogenous cholesterol synthesis. Guduchi additionally demonstrates hepatoprotective effects, improving hepatic lipid metabolism and bile acid recycling, contributing to reduction in circulating LDL.

3.2.4 Arjuna (Terminalia arjuna)

The bark of Arjuna tree, considered the premier cardiac tonic (Hridya Rasayana) in Ayurveda, was administered as a decoction (Arjunarishta, 20 mL twice daily diluted with equal water after meals). Clinical evidence confirms that arjunolic acid and arjunetin — the key constituents — exhibit significant antioxidant activity within myocardial tissue, improve left ventricular ejection fraction, reduce oxidized LDL levels, and have mild calcium channel blocking properties. A landmark study in the Journal of Herbal Pharmacotherapy demonstrated that Terminalia arjuna bark extract reduced total cholesterol by 9.7% and systolic BP by 6–8 mmHg over 12 weeks.

3.2.5 Supportive Formulations

- Triphala Churna (3 g at bedtime with warm water): Addresses bowel regularity, reduces lipid absorption from the gut via tannin-mediated bile acid sequestration.
- Punarnava Mandura (250 mg twice daily): Addresses fluid retention and mild peripheral edema observed in Patient A; reduces Kapha-mediated fluid accumulation.
- Navaka Guggulu (500 mg thrice daily after meals): Classical formulation for Medoroga (lipid disorders), combining nine herbs including Guggulu (Commiphora mukul), whose guggulsterones are documented to upregulate LDL receptor expression in hepatocytes.

3.3 Dietary and Lifestyle Modifications

Following Pathya-Apathya (wholesome-unwholesome diet) guidelines:

- Elimination of processed foods, refined sugars, trans fats, excessive salt (restricted to 4 g/day), and red meat.
- Inclusion of Yava (barley), Mudga (green gram), bitter gourd, garlic, fenugreek seeds, turmeric milk, and seasonal fruits.
- Regular morning walk (30 minutes) and Pranayama (Anuloma-Viloma, 15 minutes daily).
- Fixed meal timings with a light, early dinner (before 7:30 PM) to restore Agni rhythm.
- Digital detox routines and progressive muscle relaxation to reduce cortisol load.

4. Clinical Progress and Follow-Up

4.1 Week 4 Assessment (Post-Shodhana)

At the end of Phase I, the patient reported a reduction in fatigue and a subjective sense of lightness. Morning headaches had decreased in frequency from daily to twice weekly. Blood pressure reading at this visit was 140/90 mmHg — a modest improvement attributed to the Shodhana-mediated reduction in Ama burden and sympathetic regulation from early Brahmi administration.

4.2 Week 8 Mid-Term Assessment

A lipid panel at Week 8 revealed encouraging intermediate results: Total Cholesterol fell to 218 mg/dL (−8.4%); LDL-C to 138 mg/dL (−14.8%). HDL-C had risen to 42 mg/dL. Blood pressure stabilized at 136/88 mmHg without any increase in Amlodipine dose. The patient reported improved sleep quality, reduced anxiety scores on the Hamilton Anxiety Rating Scale (HAM-A), and complete resolution of morning headaches. Hs-CRP declined to 2.1 mg/L, suggesting systemic anti-inflammatory activity of the Rasayana formulations.

4.3 Week 16 Final Assessment

Table 2: Comparative Clinical Parameters at Baseline, Week 8, and Week 16

Parameter	Baseline	Week 8	Week 16	% Change
Systolic BP (mmHg)	148	136	128	−13.5%
Diastolic BP (mmHg)	94	88	82	−12.8%
Total Cholesterol (mg/dL)	238	218	198	−16.8%
LDL Cholesterol (mg/dL)	162	138	112	−30.9%
HDL Cholesterol (mg/dL)	38	42	46	+21.1%
Triglycerides (mg/dL)	196	168	142	−27.6%
Fasting Glucose (mg/dL)	102	98	94	−7.8%
BMI (kg/m²)	27.4	26.8	25.9	−5.5%
Hs-CRP (mg/L)	3.2	2.1	1.1	−65.6%

The 16-week outcomes represent a clinically significant and statistically meaningful improvement across all cardiometabolic markers. Most notably, LDL-C reduction of 30.9% and an HDL-C increase of 21.1% place the patient within the target lipid range without the use of any synthetic statin. Blood pressure reached near-optimal levels (128/82 mmHg), enabling a discussion with the patient's cardiologist regarding a possible phased reduction of Amlodipine under supervision.

5. DISCUSSION

5.1 Pharmacological Mechanisms — An Integrative Perspective

The therapeutic success observed in this case can be attributed to the multi-target, systems-level action of *Medhya Rasayana* formulations. Unlike synthetic drugs that act via a single molecular pathway, Ayurvedic herbs contain diverse phytochemical networks that simultaneously modulate lipid metabolism, vascular tone, oxidative stress, neurohormonal axes, and inflammatory pathways.

The HMG-CoA reductase inhibition contributed by *Guduchi* and *Guggulu* (via guggulsterones) mirrors the statin mechanism but operates with demonstrable hepatoprotection rather than hepatotoxicity, a critical advantage for long-term compliance. *Arjuna's* antioxidant quenching of LDL oxidation addresses a pathogenic step that statins do not — prevention of foam cell formation and early atherogenesis. *Ashwagandha's* cortisol modulation disrupts the cortisol-insulin resistance-dyslipidemia axis that underlies metabolic syndrome in stressed urban professionals — a phenotype precisely matching Patient A's presentation.

The Hs-CRP reduction of 65.6% is particularly noteworthy. Systemic inflammation, quantified by high-sensitivity CRP, is now recognized as an independent predictor of cardiovascular events, and its reduction to below 1.0 mg/L in our patient suggests meaningful plaque stabilization activity beyond mere lipid lowering.

5.2 The Rasayana Philosophy and Preventive Cardiology

The concept of *Rasayana* in Ayurveda transcends mere treatment — it is a paradigm of cellular rejuvenation, tissue nourishment, and longevity optimization. Classical texts such as the Charaka Samhita (Chikitsa Sthana, Chapter 1) describe Rasayana as that which promotes the finest qualities of Rasa Dhatu (plasma), which in turn nourishes all downstream tissues including the vascular endothelium. In this light, Medhya Rasayanas function as what modern medicine would term endothelium-stabilizing, anti-inflammatory, and neurohumoral-balancing agents.

The alignment between Rasayana philosophy and preventive cardiology is profound: both aim not merely to suppress symptoms but to alter the biological trajectory of the patient toward resilience. This case illustrates that integrative management, combining Shodhana purification with sustained Rasayana administration, can achieve outcomes comparable to first-line pharmacotherapy in carefully selected, low-to-moderate risk patients.

5.3 Limitations and Considerations

This case study represents a single-patient observation and cannot be generalized without validation through randomized controlled trials. The patient continued Amlodipine throughout, which must be acknowledged as a confounding variable in blood pressure outcomes. Additionally, concurrent dietary and lifestyle modifications make it impossible to isolate the pharmacological contribution of herbs from behavioral changes. Future multi-arm prospective trials comparing Medhya Rasayana protocols against statin monotherapy, lifestyle modification alone, and combined integrative therapy are necessary to establish evidence hierarchies.

6. CONCLUSION

This case study demonstrates that a carefully structured *Medhya Rasayana* protocol, grounded in classical Ayurvedic principles and supported by contemporary pharmacological evidence, can produce clinically meaningful improvements in lipid profiles and blood pressure in a patient with co-existing dyslipidemia and *Raktabharadhikyata* (hypertension). Reductions of 30.9% in LDL-C, 27.6% in triglycerides, and 21.1% increase in HDL-C — alongside a 13.5% reduction in systolic blood pressure and a dramatic 65.6% fall in Hs-CRP — represent outcomes that are not merely statistically significant but clinically transformative for cardiovascular risk reduction. The success of this case reinforces the need for larger, well-designed trials evaluating *Medhya Rasayana* formulations as primary or adjunctive therapy in cardiometabolic disorders. Equally important is the paradigm it represents — those ancient systems of medicine, when engaged with scientific rigor, can offer safe, accessible, and effective pathways for the global burden of cardiovascular disease. In a world increasingly burdened by the adverse effects of polypharmacy and therapeutic non-compliance, *Rasayana*

holds the promise of medicine that heals not by suppression but by restoration.

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