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Case Series

Understanding Neuro-modulatory mechanism of *Nasya karma* with *Dashamoola Ghrita* in Migraine with CGRP biomarker- A case series

[1]Himani Binji, [2]U. Vishnu, [3]P. B. Kadambari, [4]Raj S. Vishnu, [5*]Namboothiri Parameswaran K.

ABSTRACT:

Introduction: This case series explores the effect of *Dashmoola Ghrita Marsha Nasya* on migraine in relation to CGRP, a key neuromodulator in migraine pathophysiology. While CGRP has been extensively studied in modern medicine, its modulation through traditional *Ayurvedic* therapies remains underexplored. **Clinical Findings**: Three patients with episodic migraine presented with moderate to severe headaches, photophobia, and nausea. All had elevated MIDAS scores and serum CGRP levels, indicating significant disability and active neuroinflammatory response**. Intervention**: Patients underwent *Marsha Nasya* with *Dashmoola Ghrita (8 bindu)* for seven consecutive days. **Outcomes:** Post-treatment, patients demonstrated an average 34% reduction in MIDAS scores and an average 40% decrease in serum CGRP levels, indicating both symptomatic relief and biochemical parameters. **Conclusion:** *Dashmoola Ghrita Marsha Nasya* may exert a neuro-modulatory effect on CGRP and improve clinical outcomes in migraine. These findings suggest the potential role of integrating *Nasya* therapy with biomarker-based evaluation in the management of migraine.

KEYWORDS: Migraine, CGRP, Neuro-modulation, *Nasya karma*, *Dashmoola Ghrita*, Case series

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Corresponding Author Email: kpn@ay.amrita.edu

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1. INTRODUCTION

Migraine is a primary headache disorder and the third most common disease worldwide, affecting about 16–20% of the Indian population for the past three decades. [1] It typically presents as unilateral, pulsatile, throbbing pain lasting 4–72 hours, often severe enough to disrupt daily activities. Migraine is three times more prevalent in women and usually occurs between the second and fifth decades of life. [2] The condition is a multifactorial neurological disorder involving complex neurovascular and inflammatory pathways. A key initiating event is cortical spreading depression (CSD), a self-propagating wave of neuronal and glial depolarization followed by cortical inhibition, which explains the aura phase in some patients. [3] CSD activates meningeal nociceptors through the release of potassium ions, hydrogen ions, and glutamate, leading to trigemino-vascular activation, sustained pain signaling, and neuropeptide release. Among these neuropeptides, Calcitonin Gene related peptide (CGRP) plays a central role due to its potent vasodilatory and pro-inflammatory effects, and its elevated levels in serum, [4] cerebrospinal fluid, [5] and saliva [6] during migraine attacks support its status as a biomarker and therapeutic target. Early intervention during the aura phase may interrupt this cascade and prevent progression to headache.

CGRP (calcitonin gene-related peptide) is a 37-amino acid neuro-modulator found in C and A-γ sensory fibres of the PNS and CNS. Activation of the trigemino-vascular system releases CGRP in meninges and trigeminal nuclei, causing cerebral vasodilation and neurogenic inflammation via vascular leakage, mast cell activation, and inflammatory mediator release. CGRP levels rise during migraine attacks and remain elevated interictally in chronic cases; infusion can trigger migraine in susceptible individuals. It contributes to peripheral sensitization (lower nociceptor thresholds) and central sensitization (in trigeminocervical complex, thalamus, hypothalamus, brainstem), leading to symptoms like throbbing type of headache, vomiting and photophobia. [7] In *Ayurveda*, migraine is correlated with *Ardhavabhedaka* described by *Charaka* as *Vata* or *Vata-Kaphaja* and by *Sushruta* as *Tridoshaja* [8]. This case series investigates the systemic effects of *Dashamoola Ghrita Marsha Nasya* on CGRP level in migraine patients. We adopted *Nasya* with *Dashamoola ghrita* in 3 patients and it showed positive result in patient symptoms and reduction in CGRP level. The objective of this study is to evaluate the clinical outcomes and biomarker changes over a 14-day period following administration of *Marsha nasya*, and it is the first to systematically track both parameters within this defined timeframe.

2. PATIENT INFORMATION

CASE 1

A 25-year-old male IT technician with a 8-year history of migraine, typically last about 12 hours. Triggers included sleep deprivation and travelling. He was on sumatriptan 25 mg every 2 days and used NSAIDs for acute relief. No history of Diabetes, Hypertension and Thyroid. No other medications known to affect headache were being taken during the treatment

period. Baseline MIDAS score 11, baseline serum CGRP 33.2 pg/ml.

CASE 2

A 27-year-old female student with a 5-year history of migraine, typically last about for more than 5 hours. Triggers included sunlight and physical activity. She was on sumatriptan 50 mg every day. No history of Diabetes, Hypertension and Thyroid. No other medications known to affect headache were being taken during the treatment period. Baseline MIDAS score 18, baseline serum CGRP 37.9 pg/ml.

CASE 3

A 22-year-old male IT developer with a 10-year history of migraine, typically last about for more than 12 hours. Triggers included physical activity and stress. He was on triptan 25 mg every day. No history of Diabetes, Hypertension and Thyroid. No other medications known to affect headache were being taken during the treatment period. Baseline MIDAS score 53, baseline serum CGRP 38.5 pg/ml

Clinical Findings

Table 1 General Examination

General examination	Patient 1	Patient 2	Patient 3
Blood Pressure	118/72 mmhg	120/72 mmhg	116/76 mmhg
Pulse	78/ min	76/min	72/min
Height	160 cm	162 cm	152 cm
Respiratory Rate	16/ min	14/min	18/min
Weight	57 kg	60 kg	50 kg

Focused neurological examination revealed intact cranial nerves, normal motor and sensory systems for all 3 patients ruling out any secondary causes for headache. *Ayurvedic* assessment suggested *Vata-Kapha Dosha prakopa* with involvement of *rasa* and *rakta vaha srotas*. *Nidana-pancaka* revealed *nidana* of irregular diet and stress, *purvarupa* of irritability and light sensitivity, *rupa* of throbbing unilateral headache, and *samprapti* consistent with *Vata-kapha siroroga*.

Timeline

Table 2 Intervention

Intervention	Dates of events/intervention		
	Case 1	Case 2	Case 3
Visit 1- Screening and 1st blood sample (0th day)	16/12/2024	06/01/2025	13/01/2025
Visit 2 – *Marsha nasya* with *Dashamoola ghrita* (7 days) along with 2nd blood sample last day post *nasya*	17/12/2024 to 23/12/2024	07/01/2025 to 13/01/2025	14/01/2025 to 20/01/ 2025
Visit 3- Follow up 3rd blood sample (on 14th day)	30/12/2024	20/01/2025	27/01/2025

Diagnostic Assessment

All participants were diagnosed with migraine according to the International Classification of Headache Disorders (ICHD-3).

Diagnostic criteria included headache lasting 4–72 hours, with at least two of the following: unilateral location, pulsating quality, moderate or severe intensity, or aggravation by activity, and at least one of the

following: nausea/vomiting or photophobia/phonophobia. Participants from the OPD and IPD of Panchakarma will be recruited and was diagnosed with Migraine according to American Headache Society.

Inclusion criteria-

- Participants 18 to 45 years of age, irrespective of gender.
- Participants who fits the Diagnostic criteria according to American Headache Society.
- Migraine disability assessment score (MIDAS) is above 11.
- Participants who fits Nasya Karma.

Exclusion criteria-

- Secondary headaches due to an underlying condition, such as trauma, infection, vascular disorders.
- Pregnant and lactating women.

CGRP Assessment

- Sample type – Serum Blood
- Collection timing- It was collected before nasya (0th day), after nasya on last day (7^{th} day) and at follow up (14^{th} day)
- Storage- It was stored at -20 degree in Lab and the kit expires after 8 months from the date of opening.
- Brand- Origin company
- Method- ELISA
- Lab reference range- Normal range of CGRP in individual is 10-150 pg/ml and in Migraine patient is >200 pg/ml.

Differential Diagnosis- The differential diagnosis of migraine included chronic tension-type headache, characterized by bilateral, non-pulsatile pain without nausea or photophobia, and medication overuse headache, presenting as daily or near-daily pain associated with excessive use of analgesics. Secondary causes, including intracranial hypertension, vascular disorders, infections, and space-occupying lesions, were excluded through detailed clinical evaluation and appropriate investigations.

Therapeutic Intervention

Marsha Nasya with *Dashamoola ghrita* was given 8 *bindu* (1 *bindu* is 0.5 ml [9], total 4 ml) for 7 days continuously.

Nasya Vidhi

The *Nasya* medicine should be prepared and stored in a small container made of gold, silver, or copper, traditionally divided into three compartments, and warmed by placing it in hot water to attain the appropriate temperature. During administration, the patient's head is slightly bent forward and supported using the thumb and little finger of the physician's left hand. The eyes are covered with a clean, four-folded cloth to prevent irritation. The tip of the nose is held firmly and gently elevated, and the index and little fingers are used to alternately close each nostril while administering the medicine. Using the right hand, the physician instils the medicine into each nostril in an uninterrupted, alternating flow, either via a nasal tube or cotton-wad. Immediately following administration, the patient's ears, forehead, scalp, cheeks, nape of the neck, shoulders, palms, and soles should be gently massaged to facilitate proper distribution of the medicine and promote elimination of *doshas*. The

patient is advised to inhale the medicine slowly and gently, avoiding swallowing, as ingestion may disturb the digestive fire (*Agni)* and cause an aggravation of *doshas*. Instead, the patient should spit out the expelled *doshas* alternately from each side, ensuring even clearance of the nasal and cranial channels (*Srotas*). This process is to be repeated until the medicine and accumulated doshas are fully expelled, indicating the successful completion of the *Nasya* procedure. After *Nasya Dravya* has come out patient should be made to lie in supine posture for 100 *matra* duration. For the subsidence of irritated *Dosha*, *Vairechanika Dhumpana* is to be done and then *Ushna Udaka Gandusha* is to be done

Table 3 Drug review of Dashamoola Ghrita

Sanskrit name	**Latin name**	***Parts used***	***Quantity***
Bilwa	*Aegle marmelos*	*Moola* (root)	307.6 gm each
Agnimantha	*Clerodendrum phlomidis*	*Moola* (root)	
Shyonaka	*Oroxylum indicum*	*Moola* (root)	
Gambhari	*Gmelina arborea*	*Moola* (root)	
Patala	*Steriospermu msuveolens*	*Moola* (root)	
Shalaparni	*Desmodium gangeticum*	*Moola* (root)	
Prishnaparni	*Uraria picta*	*Moola* (root)	
Brahati	*Solanum indicum*	*Moola* (root)	
Kantakari	*Solanum Virg inanum*	*Moola* (root)	
Gokshura	*Tribulus terrestris*	*Moola* (root)	
Gritha	*Madura*	-	768 ml
Kalka Dravya			
Pushkarmoola	*Inula racemosa*	*Moola* (root)	12 gm each
Shati	*Hedychium spicatum*	Rhizome	
Bilwa	*Aegle marmelos*	Bark	
Surasa	*Ocimum sanctum*	Leaves	
Shunthi	*Zingiber officinale*	Rhizome	
Maricha	*Piper nigrum*	-	
Pippali	*Piper longum*	Fruits	
Hingu	*Ferula asafoetida*	Resin	

Dashamoola Ghrita, with *Ushna Veerya, Katu Vipaka*, and *Vata-Kapha* pacifying properties, is traditionally used for migraine (*Ardhavabhedaka*), a *Vata-Kaphaja* disorder. Its anti-inflammatory, analgesic, and dosha-balancing actions align with migraine pathophysiology, supporting its role in integrative management.

Outcome

A clinical assessment was done before, after and follow up with *Dashamoola ghrita marsha nasya*, evaluating efficacy through MIDAS score and serum CGRP levels.

Table 4: Outcome of MIDAS score and CGRP value

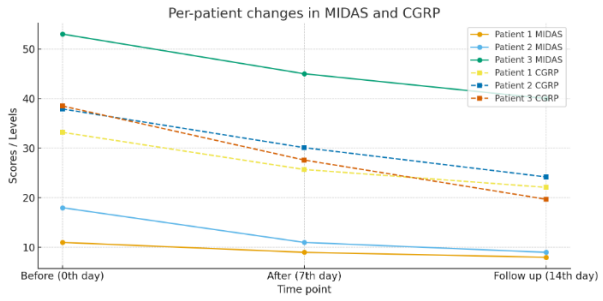
Criteria	MIDAS score			CGRP		
	Patient 1	Patient 2	Patient 3	Patient 1 (pg/ml)	Patient 2 (pg/ml)	Patient 3 (pg/ml)
Before (0^{th} day)	11	18	53	33.2	37.9	38.5
After (7^{th} day)	9	11	45	25.7	30.1	27.6
Follow up (14^{th} day)	8	9	40	22.1	24.2	19.7

The table shows a progressive reduction in MIDAS scores and serum CGRP levels in all three patients, indicating the efficacy of *Dashamoola Ghrita Marsha Nasya* in reducing MIDAS and level of CGRP biomarker in migraine. In addition, all three patients experienced a reduction in symptoms, with decreased headache intensity and frequency, and no adverse effects were observed.

The patient demonstrated good compliance with the prescribed Marsha Nasya. The procedure was well tolerated, and the patient expressed satisfaction with the treatment outcome.

3. RESULTS

Figure 1 showing the difference in CGRP and MIDAS score after *nasya karma*



All three patients showed decreasing MIDAS scores and CGRP levels over the 14 days, suggesting that the treatment or intervention was effective in reducing migraine severity and related biomarker levels. Patient 3 had the highest baseline disability and biomarker level but still showed improvement. No adverse effects were observed.

4. DISCUSSION

This case series aimed to evaluate the efficacy of *Dashamoola Ghrita Marsha Nasya* in managing migraine (described as *Ardhavabhedaka* in *Ayurveda*), considered a *Vata-Kaphaja* disorder. Modern studies identify the CGRP pathway as central to migraine pathophysiology, contributing to neurogenic inflammation, vasodilation, and pain transmission. Three patients with different levels of migraine-related disability (assessed by MIDAS) and elevated CGRP levels received *Dashamoola Ghrita Marsha Nasya* and were reassessed immediately after treatment and at follow-up.

- Patient 1 began with a MIDAS score of 11 (mild disability); post-*nasya*, the score fell to 9 (18% reduction), and at follow-up to 8 which is 27% reduction from baseline and 11% vs. post-treatment. Baseline serum CGRP was 33.2 pg/,

decreasing to 25.7 pg/mL after treatment (33% reduction) and to 22.1 pg/mL at follow-up (14% further reduction).

- Patient 2 presented with a MIDAS score of 18 (moderate disability); after *nasya*, MIDAS dropped to 11 which is 50% reduction from baseline and to 9 at follow-up which has 18% additional reduction. Correspondingly, CGRP levels declined from 37.9 pg/mL pre-treatment to 30.1 pg/mL post-*nasya* which is 36% reduction from baseline and to 24.2 pg/mL at follow-up which has 19% further reduction.
- Patient 3 had a severe baseline MIDAS score of 53; this decreased to 45 after *nasya* which is 24% reduction from baseline and to 40 at follow-up which has 11% additional reduction. CGRP fell from 38.5 pg/mL before treatment to 27.6 pg/mL post-*nasya* which is 48% reduction from baseline and to 19.7 pg/mL at follow-up which has 28% further reduction. (as shown in table 4 and figure 1)

Marsha Nasya, a form of *Nasya Karma*, involves instilling a higher dose (8 *bindu)* of medicated ghee into the nostrils. In *Ayurveda,* "*Nasa hi Shiraso Dwaram*" [10] signifies the nose as the gateway to the head, enabling direct access to the brain and CNS. *Nasya* exerts both local and systemic effects. Modern research supports this, noting that the highly vascular nasal mucosa allows rapid systemic absorption, bypassing first-pass metabolism [11]. Lipophilic, low molecular weight compounds enter efficiently, and delivery via olfactory and trigeminal pathways may bypass the blood-brain barrier, [12] explaining benefits in neurological conditions like migraine.

Dashamoola Ghrita Marsha Nasya may exert a modulatory effect on CGRP levels through both its pharmacological properties and its influence on central neuroendocrine pathways. The formulation, *Dashamoola ghrita (table3)*, possesses well-documented anti-inflammatory and immunomodulatory actions, [13] which may not only act locally at the nasal mucosa but also systemically, potentially affecting circulating biomarkers like CGRP. *Dashamoola ghrita* has characterised *brimhana* (nourishing and tissue-strengthening) properties that are particularly relevant in *vata*-related neurological disorders, such as migraine, where tissue depletion and sensory hypersensitivity are prominent. The lipid-based composition of *ghrita* enhances mucosal absorption and may facilitate nose-to-brain delivery of active compounds via the olfactory and trigeminal pathways, thereby bypassing the blood-brain barrier and reaching central structures like the hypothalamus. Furthermore, *Dashamoola ghrita* may influence the hypothalamic–pituitary–adrenal (HPA) axis, a central regulator of the stress response, cortisol secretion, and neuroimmune modulation, all of which are closely linked to CGRP regulation. Dysregulation of the HPA axis has been implicated in elevated CGRP levels, [14] resulting in meningeal vasodilation, trigeminal nerve activation, and neurogenic inflammation, which are central to migraine pathogenesis. By modulating the HPA axis and restoring neuroendocrine homeostasis, *Dashamoola ghrita nasya* may down regulate CGRP expression and release,

contributing to a reduction in migraine frequency, intensity, and associated disability. No adverse effects were observed during the treatment or follow-up period. The findings indicate a clinically significant reduction in migraine symptoms, including headache intensity, frequency, and associated complaints. A concurrent decrease in CGRP levels suggests a possible link between the intervention's therapeutic effect and modulation of migraine pathophysiology.

Limitation: The findings of this report indicate encouraging improvements in both clinical symptoms and CGRP levels. Although the current study involves a small sample size, conducting the research on a larger population would enhance the reliability and generalizability of the results, making the outcomes more widely acceptable.

5. CONCLUSION

This preliminary study suggests that *Dashamoola Ghrita Marsha Nasya* may be effective in managing migraine by reducing CGRP levels, a key neuropeptide involved in migraine pathophysiology. The therapy led to decreased migraine frequency, intensity, and MIDAS scores, indicating both clinical and biochemical improvements. The reduction in CGRP suggests possible anti-inflammatory and neuro-modulatory effects, potentially via the trigeminal nerve and hypothalamic-pituitary pathways. While promising as a multimodal therapy, further large-scale studies are needed to confirm these effects and understand the underlying mechanisms and long-term safety.

Declaration of Patient Consent – The authors confirm that they have acquired a patient consent form, in which the patient or caregiver has granted permission for the publication of the case, including accompanying images and other clinical details, in the journal. The patient or caregiver acknowledges that their name and initials will not be disclosed, and sincere attempts will be undertaken to safeguard their identity. However, complete anonymity cannot be assured.

Patient perspective –

Patient 1- I still get some pain, but it is lighter, and I don't feel so exhausted all the time.

Patient 2- After a few days, I noticed my headaches weren't as strong. I could finally focus at work without being distracted by pain.

Patient 3- For the first time in years, I felt like I had control over my migraines instead of them controlling me.

Authors Details:

[1]Postgraduate Scholar, Department of Panchakarma, Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Amritapuri, India – 690525

[2]Associate Professor, Department of Panchakarma, Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Amritapuri, India – 690525

[3]Associate Professor, Department of Panchakarma, Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Amritapuri, India – 690525

[4]Assistant Professor, Department of Panchakarma, Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Amritapuri, India – 690525

[5*]Professor & Head, Department of Panchakarma, Amrita School of Ayurveda, Amrita Vishwa Vidyapeetham, Amritapuri, India – 690525

Authors Contribution:

Conceptualization and clinical management: KPN

Data collection and literature search: MK

Writing –original draft: UV, KPB, VS

Reviewing & editing: UV, KPB

Approval of final manuscript: All authors

Declaration of Generative AI

The authors declare this manuscript was written without the use of generative artificial intelligence tools. All the content, including text generation, data analysis and references was developed and reviewed by the author without assistance from AI technologies.

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