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Case Report

An immediate pain relief with Agnikarma therapy for acute episode of migraine headache—a case report

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ABSTRACT

A 58-year-old non-diabetic, non-hypertensive, non-dyslipidemic, euthyroid lady with a known case of migraine for last 10 years approached our hospital complaining of a severe right-sided throbbing headache in the temple area and behind the right ear for three days. She approached our hospital as she did not get any relief from painkillers. An intensity of 10 was recorded on Visual Analogue Scale (VAS) and 8 on the Global Assessment of Migraine Severity (GAMS) Scale. The case was diagnosed to be *vatika shirashula* on *ardhavabhedaka*, with no *pitta-rakta* association. She was posted for *Agnikarma* therapy [AGT]. Immediately, within 2 min of application of AGT on her right temple, her intense pain reduced, and within 5 min she had no pain [zero on VAS scale and one on GAMS scale]. *Samyak mamsa dagdha lakshana* was achieved. AGT was tolerable and did not produce any major discomforts. No adverse effects were reported. Patient experienced a mild burning sensation over the AGT, and the blackish discoloration due to AGT faded off within 41 days. AGT could be used as a potent, cheap, fast-acting, adverse effect free emergency treatment for acute attacks of migraine headache.

1. Introduction

Migraine is a complex disorder characterized by moderate to severe pulsatile or throbbing headache, usually associated with nausea, photophobia, and phonophobia. It is observed more in women (three times greater than in men) and is usually presented unilaterally, but can be even bilateral. It is the second leading cause of disability worldwide and a major cause of reduced work efficiency. Classically, migraine presents either without aura (about 75% of cases) or with aura. Stress, hormonal changes, skipped meals, weather changes, sleep disturbances, and strong odors are a few of the major triggering factors. There are generally two treatment options in contemporary medicine: acute or abortive treatment and preventive treatment. Acute/abortive treatment is usually given by administering non-steroidal anti-inflammatory drugs (NSAID), triptans, antiemetics, calcitonin-gene-related peptide antagonists, dexamethasone, transcutaneous supraorbital nerve stimulation, nonpainful remote electric neurostimulation, or even peripheral nerve blocking [1].

Patients with migraine who do not respond to this conventional treatment, who develop unwanted side effects, or who are reluctant to take conventional medicines approach complementary and alternative medicines (CAM) [2]. Akhila S et al. state that Ayurveda, currently classified as a complementary and alternative medicine (CAM), is beneficial in the management of migraine without aura, with no recorded adverse effects or side effects [3]. Agnikarma Therapy [AGT], otherwise known as thermal cautery, is one of the potent tools in Ayurveda to tackle multiple conditions, including severe pain. Brinda K et al. showed that Agnikarma, along with oral medication, gives significant relief for headache[4]. No other study to date has demonstrated the immediate effect of AGT on headache. Hence, this case-report is presented to demonstrate the immediate effect of AGT on acute migraine headache. The paper has been drafted following the CARE guidelines [5].

2. Case presentation

A 58-year-old non-diabetic, non-hypertensive, non-dyslipidemic, and euthyroid lady approached our outpatient department on August 23, 2023, complaining of severe right-sided throbbing headache in the temple area and behind the right ear for three days. The patient was unable to open her eyes (due to photophobia), and due to the intense headache. There was also associated phonophobia, but without nausea,

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or vomiting. She self-medicated painkillers but did not get any relief. She approached our hospital for immediate relief from her severe headache.

The patient had been a known case of migraine for 10 years, with a regular history of recurrent throbbing right-sided headache radiating to her ocular, mandibular, maxillary, and upper back region. The pain remained for about 24–36 hours. Initially, it used to occur once in five to six months. Later, the frequency slowly increased, and started to appear at least once in two to three weeks. The pain would usually start during the night time, and would disturb her sleep. According to the patient, an MRI of her brain was taken and was found to be within normal limits [MRI report was not available with the patient]. The pain was off and on, and she took painkillers whenever it flared. Recently, she found no improvement with the painkillers, and hence she wanted to resort to Ayurveda treatments. She initially visited this hospital on March 9, 2022, seeking Ayurveda management for the same. Her uncorrected visual acuity in the right eye was 6/36, and in the left eye it was 6/18 (Snellen's chart). Her IOP was 18 mm Hg (RE) and 17 mm Hg (LE). She had a senile, immature cataract in her right eye and nuclear sclerosis in her left eye. Apart from these, no other commendable changes were observed in the anterior segment of her both eyes. She was administered medicines shown in Table 1.

The follow-up schedule and drug compliance of the patient was very poor. Hardly, the patient reported once or twice in that year. From May 3, 2023, she had regular follow-up and good drug compliance. Since then, there has been a progressive reduction in her headache. Suddenly, on August 20, 2023, she was struck with an acute episode of severe migraine.

3. Clinical findings and diagnostic assessment

Her vitals were within normal limits [BP: 146/84 mm of Hg, PR: 84/min, RR: 18/min] The headache was of the throbbing type, with her eyes in a difficult to open state due to photophobia and unbearable pain, associated with phonophobia. The intensity of the headache was 10 on the Visual Analogue Scale (VAS) [6]. On assessment through the Global Assessment of Migraine Severity [GAMS] score, it was recorded to be in grade 8. The case was diagnosed to be an acute on chronic migraine without aura. [ICD - 11.8A80.0] There was no tenderness, and the patient experienced comfort from pressure. Based on the acute manifestation, the disease was diagnosed as *Vatika Shirashula* on *Ardhavabhedaka*. [NAMC F-1 on F-8][1]. Points favoring the diagnosis and exclusions for the differential diagnosis have been summarized in Table 2.

Table 1
Showing the medicines prescribed to the patient.

Sl. No	Medication given	Reference	Dosage and timing
1	Pathya Shadangam Kwatha	Pharmacopeia: Kwatha Prakarana: No 28, Revised Edition (1996), Government Ayurveda College, Thiruvananthapuram; Pg No 82	30 ml before food, two times daily
2	Shirashula Vajra Rasa	Ayurvedic Formulary of India (Part – I) – 2:263 2nd ed. (2003), Controller of Publications, New Delhi; Pg No 19.	2 nos. after food, two times daily
3	Shadbindu Taila	Ayurvedic Formulary of India (Part – I) – 8:58; 2nd ed. (2003), Controller of Publications, New Delhi; Pg No 154.	2 drops (roughly 0.1 ml) in each nostril two times daily

[1] International classification of diseases - 11 and National Ayush Morbidity Code (NAMC), as shown in square brackets, have been used for coding the diseases respectively.

Table 2
Showing the points for diagnosis as *Vatika Shirashula* on *Ardhavabhedaka* and discarding the differential diagnosis.

Vatika Shirashula	Not Pitta/Rakta Shirashula
Animitta (No particular cause) *Nistudyate bhrisham shankhau* (Severe pain in the temples) *Nishkrishyate ivakshini* (severe ocular pain) *Sphuratyati sirajalam* (throbbing/pulsating pain) *Kandara hanu sangraha* (cervical involvement) *Mardanaih mardavam* (comfort on applying pressure) *Prakasha asahata* (photophobia) *Nishi cati matram* (increases during night)	Absence of burning sensation (*dahana*), fever (*jvara*), *svedana* (sweating), or fainting (*murcha*)
Ardhavabhedaka *Ardhe tu murdhane* (Ardha of shiras is affected)	**Not Kaphaja Shirashula** No heaviness of head (*guru*) No edema of orbits/oral cavity (*Shunakshi koota vadana*)

4. Therapeutic intervention

Assessing the intensity and severity, we immediately posted the patient for Agnikarma therapy [AGT] on the most painful site on an outpatient basis. AGT was done with a *panchaloha shalaka* using its heated base. The hot circular base of the *shalaka* was kept over the temple after placing a small two-folded single piece of 75 gsm paper for not more than 2 s at a stretch repeatedly for 5–6 times in and around the surrounding areas of pain. Before and after the AGT, we touched her eyes with cool water. [See **supplementary file 01** for the standard operating protocol (SOP).]

5. Follow-up and outcomes

5.1. Effect of AGT on intensity of headache

Her vitals after the treatment were within normal limits [BP: 140/78 mm of Hg, PR: 78/min, RR: 14/min] Immediately after the AGT (within 2 min of its application), the intensity of the pain came down, and by 5 min, it was reduced to zero on the VAS scale and to one on the GAMS scale. There was no further pain. The before and after effects of AGT on the patient have been charted in Table 3. We recorded her experience immediately after the treatment in the form of audio (see supplementary file 02). The response of the patient is in the local language (Malayalam) and has been translated to English in the patient perspective section (see Section 9).

5.2. Discomfort level and tolerance to agnikarma therapy

To assess the extent of discomfort and tolerance to *Agnikarma* therapy [AGT], we recorded them using a self-developed modified variant of the tool from a previous study [7]. Discomfort level was determined by asking, 'How much discomfort had you experienced during the *Agnikarma* procedure?' and tolerance level was assessed by asking, 'How difficult did it feel to tolerate the discomfort during Agnikarma?' on a

Table 3
Shows the comparison of various variables before and immediately after AGT

Variables	Before AGT [At 10.30 a.m.]	Immediately after AGT [At 10.35 a.m.]
Intensity of headache on VAS	10	0
GAMS Score	8	1
The nature of eyes	Closed due to pain	Opened as there was no pain

VAS scale. Both were asked in the local language (Malayalam), as the patient was not educated in English [See Supplementary File 03.]. The patient reported that there was only mild discomfort during the procedure and that it was moderately tolerable.

5.3. Adverse events/side effects

No adverse events were noted. The following side effects were noted: (a) The patient experienced a mild burning sensation in the area of AGT; (b) a small black discoloration due to the burn was noted in the area of AGT. There was no pain or wound in the area of AGT.

5.4. Further follow-up and outcome

The patient was given medicines advised in Table 1 and was asked to come for review on September 13, 2023. She had good drug compliance and had no headache. The black discoloration remained as such, and there was no burning sensation. She was again asked to continue the same for another two weeks and then come for review. She reviewed us on October 4, 2023, and had complained of mild pain in the vertex of her head, for which the same medicines shown in Table 1 were continued. Along with it, *Asanavilwadi Taila* [Ref: Ayurvedic Formulary of India (Part - I) - 8:3; 2nd ed. (2003), Controller of Publications, New Delhi; Pg No: 130] was also given for application over the vertex. Her right temple remained free of pain. There was no evidence of black discoloration at the site of AGT.

6. Timeline

The timelines of the events happened till October 4, 2023 is described in Table 4.

7. Discussion

7.1. Discussion on usage of assessment scale

To assess the severity of migraine headache, several standardized and validated tools are used, like the Migraine Disability Assessment Scale (MIDAS), the Headache Impact Test, the Henry Ford Disability Inventory, and the Migraine Severity Scale. However, these scales focus more on the migraine related disabilities and are sensitive to recall bias. In a busy clinical setting or an out-patient setup, brief measures of patients' perspectives regarding their disease severity are needed instead of the previously mentioned lengthy severity assessment measures. Hence, we used the Global Assessment of Migraine Severity [GAMS] scale to assess patients' perceptions of their disease severity [8]. Visual Analogue Scale (VAS) is a supportive tool to objectively mark subjective variables. Hence, we also deployed it to strengthen the evidence. As the patient had severe throbbing pain, and had kept her eyes closed, we made the patient to record both the pre and post assessment scales after her pain subsided.

Till date there are no validated scales available in credible databases for assessing the discomfort and tolerance to *anushastra karma* (para-surgical procedures) like *agnikarma*, *kshara karma*, and *jalukavacharana*, either in English or any local language. Hence, we resorted to the discomfort/tolerance scale used in the study of Ou, J., Lu, K., Li, J. *et al*, which was based on previous studies, and hence we considered them as valid. [7] They used a five point VAS scale to assess the discomfort/tolerance. We found that our patient was not able to comprehend that scale. Hence, taking the cutoff description for dichotomization of the data in the original paper as a guide, we arbitrarily gave each of the five points in VAS scale a particular description. We also added a point zero to the scale, which we considered as no discomfort/issue at all. The patient could comprehend this scale, and she marked her experience in the scale. Since we modified the original scale, we have deliberately used the terminology 'self-developed modified variant of the tool from a previous study'.

Table 4
Showing the timelime of various events till October 04, 2023

Timeline	Events	Remarks
Period of 10 years before 09.03.2022	The patient had migraine, which was waxing and waning. Initially, it occurred once in five to six months. Later, it appeared once in two to three weeks.	Initially for 7–8 years she was taking contemporary treatments. Later, she did not get relief with any of those medicines. Hence she came for Ayurveda treatment.
09.03.2022	Started Ayurveda treatments	Irregular followup
From 03.05.2023	Came for treatment and was on regular follow up	Periodicity and intensity of pain reduced
23.08.2023 at 1010 Hrs	Patient came with severe throbbing pain (acute episode of migraine)	Was associated with Photophobia and phonophobia.
23.08.2023 at 1030 Hrs	Agnikarma Therapy (AGT) was performed	*Mamsa dahana* was achieved
23.08.2023 at 1035 Hrs	Patient became pain free.	The pain reduced within 02 min and was completely relieved within 5 min
04.10.2023	Patient had mild pain in the vertex region	There was no pain for a period of 41 days.

7.2. Discussion on the diagnosis and treatment options

Migraine is comparable to *Ardhavabhedaka*. It could be either *vata-pradhana* or *vata-kapha pradhana*. Other *doshas* like *pitta* and *rakta* may also be involved, which could be probed through their respective signs and symptoms [see Table 2 for the differentiation]. *Shirashula* (headache) is the chief complaint in *Ardhavabhedaka*, which is unilateral and repetitive [9]. [*Uttara Sthana*; *Shiroroga Vijnaneeyam adhyayam*: Chapter 23, verse 7–8] *Vatika shirashula* is a type of headache that does not have the above characteristics but has a very severe throbbing/pulsating type of headache. Since the patient presented to us with the symptoms of the latter but had even the symptoms of the former, we diagnosed the case as *vatika shirashula* on *Ardhavabhedhaka*.

Shodhana procedures like *Nasya, Virechana,* and *Shamana* procedures in the form of medicated ghee or poly-herbal decoctions have been described for *Ardhavabhedaka* in the classics [3,4]. Vaidya PB et al. have demonstrated the effectiveness of oral medications in reducing the intensity of migraine headache in 406 patients [2]. The role of AGT and oral medications has already been demonstrated by Soman A [3]. We here report the effect of AGT on acute episode of migraine headache.

7.3. Discussion on the role of season in triggering migraine and impact on AGT

The season in Kerala (as of August 23, 2023) was extremely hot with high humidity and a lack of proper rainfall. The current scenario could be considered a *mithya-yoga* of *varsha ritu* and an *atiyoga* of *greeshma ritu*. During this season, *vata* gets vitiated. In other words, the seasonal imbalance could have triggered this severe headache in the patient, despite being on Ayurveda prophylactic medicines. There could be other unknown factors (*animitta karana*) which could have played a role in the onset of headache. These factors along with the trigger (vitiated *vata* due to the seasonal imbalance) may have created a severe *vata prakopa*, which had localization in right side of head. This manifested as severe throbbing pain for which she had come as an emergency to the OPD. Agnikarma, on the particular site of *vata prakopa*, shall reduce its vitiation immediately (applicable only in *kevala vata/vata associated with kapha*). When the vitiation of *vata*, has been normalized within a short period of time, the pain totally reduced.

This season is actually contraindicated for doing *agnikarma*, but in emergencies, it can be done after following the preventive measures [10]. [*Sutra Sthana*; *Agnikarma vidhim adhyayam*: Chapter 12, verse 6] Here, the case was an acute presentation of migraine, which was an

emergency. We touched the eyes of patients with cool water before and after AGT, thereby giving countermeasures for the seasonal contraindication.

7.4. Discussion on role of dietary precautions before AGT

AGT has to be done after the patient has been fed soft food that is cool in potency. We did not follow that, as the patient who had acute pain was not in a situation to be fed these items and then perform the treatment. Hence, considering the emergency, we directly did the AGT. After AGT, we recommended the patient to consume luke-warm (not hot) *kanji* (rice gruel) with 1 teaspoon of cow's ghee to counter any adverse effects of this therapy.

7.5. Discussion on the role of agnikarma therapy [AGT] and its procedures

AGT is a potent treatment mode mentioned in Ayurveda. Even though it is practiced by many clinicians for acute episodes of migraine, documented evidence is meager. Pain shall never manifest without the presence of *vata* [10]. [*Sutra Sthana*; *Ama pakveshaneeya adhyaya*: Chapter 17, verse 7] *Agni* is the best treatment for *shula* (pain) [11]. [*Chikitsa Sthana*; *Dvivraneeya Cikitsa*: Chapter 25, verse 40] AGT has been indicated in areas where medicines, *shastra,* and *kshara* karma fail [12]. [*Sutra Sthana*; *Agnikarma vidhim adhyayam*: Chapter 12, verses 3–16] It is indicated in severe pain (*atygraruji*) in *twak, mamsa, sira, snayu, sandhi and asthi* caused by *vata* [12].

It has a special role in *vatika shirashula*. *Ardhavabhedaka* has the same line of treatment as that of *vatika shirashula*. AGT has been indicated in conditions where other treatments fail [9] [*Uttara Sthana*; *Shiroroga pratishedham adhyaya*: Chapter 24, verses 8–9] but we had used it as an acute measure for the intense pain, abiding by the previous explanation. *Agnikarma* is mainly of two types: *Tvak dagdha* [*Agnikarma* of skin] and *Mamsa dagdha* [*Agnikarma* of *Mamsa*]. *Lauha* [metals] are generally used for *mamsa dahana.* [12] In this condition, we wanted to achieve *mamsa dahana* to relieve the pain, as *tvak dahana* would be only a superficial therapy. The study by Soman A 2022 was contrary to our approach, as they performed *tvak dahana*. Our report shows that *mamsa dahana* in *ardhavabhedaka/vatika shirashula* helps in bringing complete relief of acute pain in one sitting.

Keeping a small piece of 75 gsm paper over which AGT is done is not defined in the literature. It was done based on experience and helps to prevent the contact of red-hot *shalaka* over the skin directly, so as to prevent severe burns over the skin. In this condition, *mamsa dahana* was the intention, and the heat needed to go deep inside the skin without creating a wound at the AGT site. The single piece of 75 gsm paper prevented the direct contact of the hot *shalaka* with the skin to prevent it from wounding and, at the same time, transferred the intense heat to *mamsa*, resulting in *mamsa dahana*. Keeping the paper is not recommended for conditions where *tvak dahana* is required.

In diseases of head, *agnikarma* is said to be done over the eye brows, forehead, and/or temple [12]. We chose the temple as the site of *agnikarma*, as this was the most painful area. Four shapes of *agnikarma* have been described. They are *valaya* [circular shape], *bindu* [dot], *vilekha* [straight line], and *pratisarana* [spread wide] [12]. We used a *valaya akriti* (circular shape). We did this because the *dosha stithi* was very severe, and the point of contact of a large area (the flat surface of the *agnikarma shalaka*) would help in delivering more heat to the area to control the highly vitiated *vata*.

After AGT, it has been advised to apply *madhu* and *ghrita* [12]. But we initially applied *Kumari* (*Aloe vera*) gel, followed by the application of Murivenna. *Kumari* is *sheeta* in *veerya* (cold potency), *netrya* (beneficial for eyes), and is especially indicated in *agni dagdha* (burns) and *vishphota* [13]. [*Poorva Khanda; Misra prakarana:* chapter 4, verse 196] Murivenna is a special preparation from Kerala [Ref: Pharmacopeia - Taila Prakarana:37. Revised 1st ed. Reprint (2002). Publication Division, Ayurveda College, Thiruvananthapuram; Pg No. 174]. It is used for application on *sadyovrana* (acute wounds) and *agni dagdha* (burns).

7.6. Discussion on perfectness of the treatment and the presence of patches

We had a *samyak dagdha lakshana* (optimum *agnikarma* was achieved). The *dahana* was neither too deep nor too superficial; it even had the color of *taalaphala.* [12] [See Fig. 1(b)]. *Taalaphala* is the Asian Palmyra Palm fruit. 'The pigeon color' of the site of *dahana* indicates *mamsa dahana* has occurred (*mamsa dagdha*) [12]. Here, we achieved this condition (see Fig. 1 (b)). This discoloration that developed as a result of the burn induced in the *mamsa dhatu* remained for about 41 days, after which it disappeared. Hence, the cosmetic disfigurement was temporary in nature.

Agnikarma could be possibly explained from the angle of thermotherapy, even though they are not exactly similar. A previous study shows that thermotherapy reduced acute pain by inhibiting pain signals [14]. Migraine is believed to be caused by the activation of neuronal pathways of the trigeminal nerve [1]. Hence, *agnikarma* was done in the temporal area, which is a site of the sensory nerves of the trigeminal nerve. Hence, it could be postulated that it may have possibly inhibited the pain pathway of the trigeminal nerve leading to sudden reduction in pain. Further robust scientific studies are required to get a concrete picture of the mode of action.

7.7. Discussion on role of ayurveda in acute management of pain

Ayurveda generally has a holistic approach to treatment, but acute management of symptoms can also be elucidated from the classics, especially from Sushruta Samhita. The descriptions of *yuddhabudhi chikitsa, dvivraniya chikitsa, sadyovrana chikitsa, bhagna chikitsa, and marma chikitsa* all focus on acute management of cases during critical situations. Holistic approaches using bio-purification methods generally focus on reducing the severity of chronic diseases and preventing their relapse. But the acute management strategies in the above-mentioned scenarios focus on symptomatic management. Future research should also probe the possibilities of Ayurveda in acute management strategies, especially in pain, so that cost-effective, quick acting, and least side-effect strategies could be delivered to patients.

7.8. Limitations of the case report

We modified the previously used five point five scale into a six point scale. Even though we performed this modification to make the patient understand what the five points meant so as to mark her response, the validity of the scale is questionable. Hence, this scale has to be scientifically validated, before using it further for any research on discomfort and tolerability of *anushastra karma*.

8. Conclusion

Agnikarma therapy [AGT] can act as a potent, powerful, cheap, non-pharmacological, simple to use, and out-patient based procedure for pain management in acute cases of migraine. It could help in complete reduction of pain and maintain it at least for a period of 30 days. The treatment should be adopted only when it is of *vatika shirashula* or has involvement of *kapha* in it. It should never be done in *pitta/rakta* involvement. Further robust research with control groups is warranted to conclude the effectiveness of this treatment methodology. This case report also highlights the need for developing validated scales for assessing the discomfort and tolerance level for all the *panchakarma*, *shastra karma* (surgical) and *anushastra karma* (parasurgical), both in english and local languages, for further development of ayurveda.

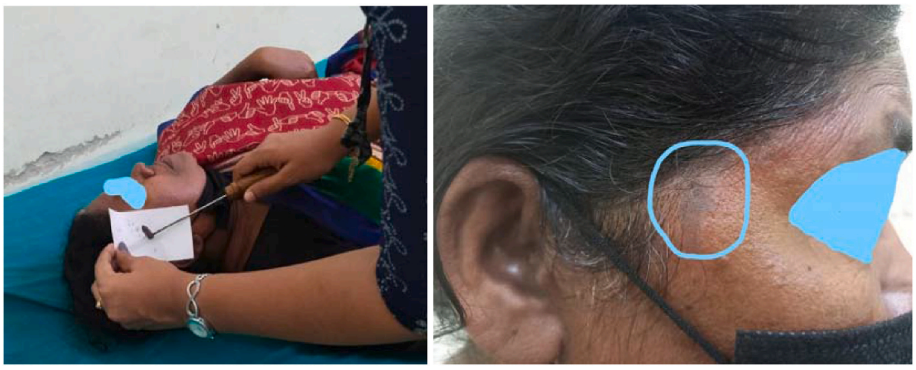

Fig. 1. (a) shows *agnikarma therapy* [AGT] being done at the temple area, the point of maximum pain, with the flat circular base of the hot *shalaka* after keeping a small piece of 75 gsm paper. (b) shows the *taalaphala iva* or *paravat iva* discoloration in the area of AGT (marked by the blue circle).

9. Patient perspective

"I came to the hospital with extremely severe pain in the right side of my head, which had not reduced for three days. I was not even able to open my eyes properly due to the pain. The doctor did some heat treatment over my head, and immediately the pain was relieved. Now, I can open my eyes too."

The patient perspective is a translated statement of the original recording of the patient in the regional language of Kerala, Malayalam.

Informed consent

We declare that we have obtained informed written consent prior to the administration of Agnikarma therapy [AGT] and for the publication of these research findings.

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Author contributions

PB: Conceptualization; Visualization, Writing Original Draft, **ES:** Visualization, Review and Editing, **LR:** Conceptualization, Visualization, Review and Editing.

Declaration of generative AI in scientific writing

The authors declare that no generative AI or AI-assisted technologies have been used in the writing process.

Conflict of Interest

The authors declare that there is no conflict of interest

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jaim.2024.100953.

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