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CLINICAL AND BIOCHEMICAL OUTCOMES OF AYURVEDIC MANAGEMENT IN HYPOTHYROIDISM: A CASE SERIES

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ABSTRACT

Background: Hypothyroidism is a common endocrine disorder associated with diverse clinical manifestations and requires sustained clinical and biochemical monitoring. Ayurveda provides an individualised approach based on clinical presentation and Ayurvedic assessment. This case series describes clinical and biochemical observations during individualised Ayurvedic management in patients with hypothyroidism.

Case Presentation: Four patients with documented hypothyroidism, comprising three females and one male aged 24-45 years, were managed with individualised Ayurvedic interventions. The duration of hypothyroidism ranged from approximately 1 to 12 years. Presenting features included weakness, lethargy, dry skin, constipation, joint pain and swelling, hair loss, weight gain and stress-related complaints. Baseline serum thyroid-stimulating hormone (TSH) levels ranged from 8.92 to 33.97 µIU/mL. The patients received individualised Ayurvedic formulations with treatment modifications according to clinical response and dietary and lifestyle advice where documented. In Case IV, levothyroxine was continued concomitantly, with its dose subsequently reduced during follow-up.

Results: Serum TSH decreased from baseline in all four cases during the documented treatment and follow-up period. The mean serum TSH decreased from 16.63 ± 11.66 µIU/mL at baseline to 3.47 ± 1.18 µIU/mL at the final documented follow-up, representing a mean absolute reduction of 13.16 ± 11.29 µIU/mL and a mean percentage reduction of 74.47 ± 13.12%. Improvements in selected clinical features, including fatigue, lethargy, joint symptoms, dry skin, constipation and hair-related complaints, were also documented. No treatment-related adverse events were reported in the available records.

Conclusion: This case series describes changes in clinical features and serum TSH following individualised Ayurvedic management in four patients with hypothyroidism. The observations provide clinical documentation that may support further systematic investigation, while the small sample size, heterogeneous interventions and follow up duration limit causal interpretation.

KEYWORDS: Agnimandya, Ayurveda, Case series, Hypothyroidism, Medognimandya, Thyroid stimulating Hormone.

1. INTRODUCTION

Hypothyroidism is a common endocrine condition characterised by reduced thyroid hormone production and characterized by a generalized reduction in the rate of metabolism. It involves multiple body systems and can present with a range of clinical features, from mild and often unrecognized symptoms to more severe metabolic disturbances [1]. The prevalence of hypothyroidism varies worldwide between about 0.3% to 12%. It is more common in females and increases with age [2].

The standard approach for management is long-term hormone replacement therapy. Despite restoration of biochemical thyroid status, symptoms may continue to be reported by some individuals [3], suggesting the need to achieve a more comprehensive and personalized approach to care. These clinical presentations can be understood in Ayurveda in the light of the concepts of Agnimandya (reduced digestive and metabolic efficiency) and imbalance of Kapha, Pitta and Vata Dosha [4,5]. This disturbance leads to improper metabolism of the tissues and accumulation of Aam which may lead to manifestation of symptoms observed in hypothyroidism. Thus, the Ayurvedic management is aimed at reestablishing the metabolic balance, improving the digestive fire and correcting the Dosha disturbances by individualized therapeutic interventions. But there is limited clinical proof regarding the role of Ayurvedic management in hypothyroidism thru documented case series. Keeping this in view, present case series was undertaken to observe the effect of Ayurvedic management in patients of hypothyroidism with emphasis on clinical improvement and change in biochemical parameters.

2. MATERIALS AND METHODS

Study Design

This was an observational case series describing four patients with documented hypothyroidism who received individualised Ayurvedic management at OPD No. 2, Department of Kriya Sharir, Seth Surajmal Bambaiyawala Ayurved Hospital, Jaipur. Clinical information, laboratory investigations, treatment details and follow-up observations available in the medical records were reviewed and presented in chronological order.

Data Source and Case Selection

Clinical records of patients managed during 2024-2025 were screened. Four cases were included based on the availability of documented diagnosis of hypothyroidism, Ayurvedic treatment records, baseline and follow-up thyroid function assessment, and follow-up information.

Inclusion Criteria

1.A diagnosis of hypothyroidism with elevated serum TSH according to the laboratory reference range.
2.Prescriptions of individualised Ayurvedic management at the study centre.
3.Availability of baseline and follow-up serum TSH values.
4.Adequate clinical documentation and follow-up information.

Exclusion Criteria

Records were excluded when they had:
1.Incomplete clinical or laboratory documentation.
2.Insufficient follow-up information.
3.Severe coexisting conditions that could substantially interfere with interpretation of the clinical or biochemical findings.

3. Patient Information

Case I. A 45-year-old female homemaker presented to the OPD with a history of hypothyroidism for approximately four months. She reported weakness and lethargy, along with bilateral knee and elbow joint pain for approximately one month. She had no reported history of any other major chronic illness. Following clinical assessment, individualised Ayurvedic management was initiated. At the initial visit in April 2024, her serum thyroid-stimulating hormone (TSH) level was 8.92 µIU/mL, and 25-hydroxyvitamin (OH) Vit D was 17.2 ng/mL.

Case-II. A 39-year-old male government employee presented to the OPD with a history of hypothyroidism for approximately one year. He reported dry skin, lethargy and generalised weakness for approximately two months. He had received treatment for hypothyroidism prior to seeking Ayurvedic management. There was no history of hypertension, diabetes mellitus or any other major chronic illness. His father had a history of hypertension. There was no reported history of thyroid enlargement. The patient opted for individualised Ayurvedic management after clinical assessment.
At the initial visit on 13 November 2024, serum thyroid-stimulating hormone (TSH) was 33.97 µIU/mL and erythrocyte sedimentation rate (ESR) was 32 mm/hr.

Case III. A 24-year-old female student presented to the OPD with a history of hypothyroidism for approximately 12 years. She had anterior neck swelling measuring approximately 5 × 2 cm, dark facial patches, hair loss, gradual weight gain and constipation. She also reported disturbed sleep for approximately four months. On clinical examination, the anterior neck swelling was noted. At the initial assessment on 20 November 2024, serum TSH was 12.68 µIU/mL, serum iron was <23.23 µg/dL, and haemoglobin was 6.5 g/dL. Individualised Ayurvedic management was subsequently initiated.

Case IV. A 34-year-old female presented to the OPD with a six-year history of hypothyroidism. She reported stress, constipation and low energy, along with swelling and pain involving the metacarpophalangeal and proximal interphalangeal joints, wrists and elbows for approximately two years. Clinical examination revealed mild swelling and tenderness of the affected joints, with no thyroid enlargement. She had been taking levothyroxine 100 µg for hypothyroidism before initiation of individualised Ayurvedic management. At the initial assessment in November 2024, her serum TSH level was 10.93 µIU/mL. Individualised Ayurvedic management was initiated with continuation of levothyroxine.

4.TIMLINES

Table 1. Chronological Clinical Course and Follow-up of the Patients

The clinical course of each patient, including the initial presentation, relevant previous treatment, Ayurvedic intervention, laboratory assessment is summarised chronologically in Table 1.

Case	Time point	Clinical and therapeutic events	Thyroid-related investigations / findings
Case I	Apr 2024	First clinical visit; individualised Ayurvedic management was initiated. Medicines were prescribed for 15 days.	Serum TSH: 8.92 µIU/mL; 25-hydroxyvitamin (OH) Vit D: 17.2 ng/mL
	Mid -Apr 2024	First follow-up: Mild improvement was noted in some of the presenting complaints, and the medicines were continued for a further 15 days.	-
	May 2024	Follow-up assessment after approximately one and half months of Ayurvedic management. Patient reported feeling of fresh and active, relief in knee joint and elbow joint pain	Serum TSH: 2.34 µIU/mL

	Sept 2024	Follow-up assessment. The patient was clinically and symptomatically stable, with no adverse effects reported.	Serum TSH: 2.01 µIU/mL; 25-hydroxyvitamin (OH) Vit D: 29 ng/mL
Case II	13th Nov 2024	First visit to the OPD; clinical assessment was conducted and individualised Ayurvedic management was initiated.	Serum TSH: 33.97 µIU/mL ESR 32mm/hr
	20 and 27th Nov 2024	First follow-up: No significant change was reported in the previous symptoms. The patient additionally reported gastric discomfort and increased abdominal gas. Second follow-up: The patient reported feeling more relaxed and lighter, with an overall sense of well-being.	-
	Dec 2024 Jan 2025-Mar 2025	The prescribed medicines were continued, with adjustments in dose and combination at approximately 15-day intervals, according to the patient's clinical response. Continued gradual improvement in the presenting symptoms was noted.	January 2025 Serum TSH: 19.38 µIU/mL ESR 16 mm/hr
	Apr 2025	Relief in previous complaints	Serum TSH: 7.07 µIU/mL ESR 11 mm/hr
	Oct 2025	Clinically and symptomatically stable	Serum TSH: 4.02 µIU/mL
Case III	20 Nov 2024	Visited the OPD; clinical assessment and examination were performed, investigations were carried out, and Ayurvedic management was initiated.	Serum TSH: 12.68 µIU/mL; serum iron: <23.23 µg/dL; Hb 6.5 gm/dL
	27 Nov 2024	First follow-up; the patient reported feeling energetic.	-
	11 Dec 2024	Follow-up assessment; On examination there was reduction in swelling and improvement in facial skin changes. The medicines were modified and continued.	-
	Jan 2025	Continued follow-up; gradual improvement in the previously reported symptoms was noted. The prescribed medicines were continued with appropriate modifications.	-
	Feb 2025	Follow-up assessment after approximately three months of Ayurvedic management. Improvement in the clinical features was noted. No adverse effects related to the medication were reported.	Serum TSH: 1.13 µIU/mL; serum iron: 29.76 µg/dL. Hb 7.6 gm/dL
	Aug 2025	Continued follow-up; the patient reported marked reduction in throat swelling and improvement in hair quality, with reduced hair fall. No adverse effects were reported, and the patient remained under clinical observation.	Serum TSH: 3.09 µIU/mL; serum iron: 28.34 µg/dL. Hb 9.6 gm/dL
Case IV	Nov 2024	Presented to the OPD with a six-year history of hypothyroidism and was taking levothyroxine 100 µg. Individualised Ayurvedic management was initiated after clinical assessment.	Serum TSH: 10.93 µIU/mL
	Mid Nov 2024 -Jan 2025	Follow-up visits were conducted at approximately 15-day intervals. Ayurvedic medicines were continued with mild modifications, and gradual improvement was noted in joint swelling, pain and other presenting complaints. From mid-January 2025, the levothyroxine dose was reduced from 100 µg to 75 µg.	-
	Feb 2025	Approximately 50% improvement was noted in the overall presenting complaints, including joint swelling and pain. The levothyroxine dose was reduced to 50 µg, and Ayurvedic medicines were continued.	Serum TSH: 7.39 µIU/mL
	April 2025	The patient reported continued improvement in her symptoms and was clinically stable.	Serum TSH: 5.66 µIU/mL
	July 2025	The patient reported feeling well, with continued improvement in her symptoms. Ayurvedic medicines	Serum TSH: 3.20 µIU/mL

		were gradually reduced, and the levothyroxine dose was further reduced to 25 µg.	
	Nov 2025	Continued follow-up with monitoring of thyroid function; swelling and pain over the MCP and PIP joints showed regression.	Serum TSH: 4.74 µIU/mL

Abbreviations: MCP, metacarpophalangeal; PIP, proximal interphalangeal; TSH, thyroid-stimulating hormone.

5.Diagnostic Assessment

Hypothyroidism was documented based on elevated serum TSH and the thyroid function investigations available during the patients' clinical evaluation. Laboratory reference ranges were interpreted according to the reporting laboratory. Additional investigations, including T3, T4, 25-hydroxyvitamin D and serum iron, were recorded when available, specifically noting those with abnormal findings or values outside the reference range. Clinical assessment included relevant presenting features and examination findings, including the presence or absence of thyroid enlargement or other palpable thyroid abnormalities. The patients continued to attend follow-up visits during the observation period, and subsequent clinical and laboratory findings were documented as available.

6.Therapeutic Intervention

The patients received individualised Ayurvedic management based on their clinical presentation and Ayurvedic assessment. The therapeutic interventions primarily comprised oral Ayurvedic formulations, along with dietary and lifestyle advice where documented. The treatment approach was individualised according to the presenting features and clinical requirements of each patient.

For each case, the Ayurvedic formulations, dosage, strength, route of administration, frequency, duration of therapy and any modifications made during follow-up were documented from the clinical records. The interventions included formulations selected according to the individual clinical presentation and the intended Ayurvedic therapeutic rationale, such as Agni Deepana (supporting digestive and metabolic function), Aam Pachana (supporting digestion and the Ayurvedic process of reducing Aam), Dosha Shaman (balancing the aggravated Dosha), Vatanulomana (supporting the normal direction of Vata functions), and supportive Rasayana therapy (rejuvenative and restorative care), where applicable. These Ayurvedic concepts were used as the therapeutic rationale and were not considered direct equivalents of specific biomedical mechanisms.

Treatment modifications during follow-up, including addition, discontinuation, dose adjustment or continuation of individual formulations, were made according to the patient's clinical status and subsequent follow-up findings. The reasons for such modifications were documented where available. In Case IV, levothyroxine 100 µg was continued concomitantly with Ayurvedic treatment and was therefore considered while interpreting the subsequent thyroid function findings.

The case-wise details of the therapeutic interventions, including formulation, dosage, route, frequency, duration and treatment modifications, are presented in Table 2.

Table:2 Case-wise Ayurvedic Treatment Details

Cases	Ayurvedic formulation(s)	Dose and Frequency	Duration	Therapeutic Rationale
I	Kanchanar Kashay	20 ml twice a daily before meals	1month	Lekhana, Kapha-Vat Shaman
	64 Prahar Pipali 500 mg + Laghumalini Vasant 500 mg + Vatvidhvansak Ras 125 mg	twice a daily before meals	1month	Agni Deepana, Aampachana, and improved nutrient absorption
	Erandbhrishta Haritki	5 gm bedtime	21days	Aampacha and, Vatanuloman
	During the follow-up period, the combination of 64 Prahar Pippali, Laghumalini Vasant and Vatavidhvansak Ras was continued, with periodic modifications in dosage and duration as required.			
II	Kakalrakshak Yog	One tablet twice a day before meal	First 3 months	Metabolic correction and thyroid gland support
	64 Prahar Pipali 500mg+Arogyavardhini Vati 500mg+ Kaparda Bhasma 500mg+Amlaki Churn 1gm	twice a day before meal	4 months	Agni Deepan

	Gandmala Kandan	One tablet twice a daily after meal	Final 2 months	Management of Granthi Vikara
	M Shankhapushpi	20 ml twice a daily after meal	Intermittently for 1 month	Stress management and mental relaxation
	Tab Thyrocalm	One tablet twice a daily after meal	for First month, and final 2 months	Thyroid gland support and hormonal regulation
	Erandbhrishta Haritki	3 gm bedtime	As needed (SOS)	Vatanuloman
	Throughout the follow-up, Kakalrakshak Yog tablet and Thyrocalm tablet were maintained, with adjustments in their dosage and duration made periodically according to the clinical requirements.			
III	64 Prahar Pipali 500 mg + laghumalini Vasant 500 mg + Jahar Mohara 500 mg + Yashtimadhu Churn 500mg	twice a daily before meal	3 months	Agni Deepan, and metabolism correction
	Kanchanar Kashay	20 ml twice a daily after meal	3 months	Lekhana, Kapha-Vat Shaman
	Ashwagandha Rishta+Drakshasav	20 ml each with equal amount of water twice a daily after meal	3 months	Rasayan, and Balya
	Triphala Churn	3 gm bedtime	3 months	Doshanuloman
	In addition, the remaining medications were the same as those administered in Case II.	-	3 Months	-
Navayas Lauha and Arogyavardhini Vati were continued during follow-up, along with a combination of 64 Prahar Pippali, Laghumalini Vasant, Shankha Bhasma and Yashtimadhu Churna, with the dosage and duration modified periodically as clinically indicated.				
IV	64 Prahar Pipali 500 mg + Kamdudha Ras 500mg+ Godanti 500 mg + Sitopaladi Churn 3gm	twice a daily before meal	4 Months	Vat-Pitta Shaman,Agni Deepan
	Dhatri Lauh	One tablet twice a daily after meal	2 months	Improve Dhatu Poshan and overall metabolic efficacy.
	Ashwagandharishta + Abhyarishta	20 ml each with equal amount of water twice a daily after meal	One and half Months	Agni Deepana and restoration of hormonal balance.
	Erandbhrishta Haritki 2 gm + Kutki 500 mg	bedtime	Initially for 1 month, and for second last month	Vatanuloman, Kostha Shuddhi
	Jyotismati Tail	Four drops with milk bedtime	2 months	Mental relaxation and stress reduction
Tablet Thyrocalm were continued throughout the follow up period				

7.Follow up and Outcomes

The principal biochemical outcome was the change in serum TSH from baseline to the documented follow-up assessment. Clinical outcomes included changes in presenting symptoms documented in the medical records, such as fatigue, lethargy, weakness, constipation, dry skin, hair loss, weight-related complaints and joint symptoms. The date-wise follow-up details and corresponding TSH values are presented in **Table 1**.

8. RESULT

An analysis of the case notes revealed clinical and biochemical improvement in all four cases of hypothyroidism following documented Ayurvedic management. All four patients showed a decline in serum TSH levels, with the mean serum TSH decreasing from 16.63 ± 11.66 μIU/mL at baseline to 3.47 ± 1.18 μIU/mL at the final documented follow-up. The mean absolute reduction in TSH was 13.16 ± 11.29 μIU/mL, corresponding to a mean percentage reduction of 74.47 ± 13.12%. Improvements were also documented in selected clinical features, including fatigue, lethargy, joint symptoms, dry skin, constipation and hair-related complaints. In the medical records reviewed, no treatment-related adverse events were reported.

Statistical Analysis

Because only four cases were included, no inferential statistical testing was performed. Data were summarised descriptively using individual values, mean ± standard deviation (SD), absolute change and percentage change in serum TSH.

Percentage reduction in TSH was calculated as:

Percentage reduction = [(Baseline TSH − Follow-up TSH) / Baseline TSH] × 100.

9. DISCUSSION

Hypothyroidism is a widely recognised endocrine condition characterised by inadequate synthesis of thyroid hormones and is associated with manifestations involving multiple physiological systems. In primary hypothyroidism, impaired thyroid hormone synthesis results in reduced circulating thyroxine (T4) and triiodothyronine (T3), with a compensatory increase in thyroid-stimulating hormone (TSH) [6]. Commonly reported features include tiredness, weight gain, increased sensitivity to cold, constipation, dry skin and reduced energy levels [7,8]. At the cellular level, thyroid hormones influence mitochondrial function, energy expenditure and several metabolic processes. Therefore, insufficient thyroid hormone production may result in reduced metabolic activity [9,10].

For primary hypothyroidism, treatment primarily involves thyroid hormone replacement therapy, principally with levothyroxine, with treatment and dose adjustment guided primarily by serum TSH levels and clinical assessment [11]. Although levothyroxine effectively restores biochemical euthyroidism in most patients, a proportion of treated individuals may continue to report symptoms despite biochemical normalisation [12,13]. These findings have led to further investigation into the pathophysiology of persistent symptoms and the possible utility of adjunctive approaches. Nevertheless, thyroid hormone replacement remains an important component of management when clinically warranted.

From an Ayurvedic perspective, the clinical features observed in hypothyroidism may be considered in the context of Agnimandya (reduced digestive and metabolic function) and disturbance of Kapha, Pitta and Vata Dosha, with impaired metabolic processes and manifestations that may involve Aam formation [14,15]. The therapeutic approach in the present cases was individualised and included interventions aimed at Agni Deepana, Aam Pachana, Dosha Shaman, Vatanulomana and supportive measures such as Rasayana therapy. These interpretations represent an Ayurvedic conceptual framework and should not be considered equivalent to specific biomedical pathophysiological mechanisms.

In the present case series, formulations including Kanchanar Kashaya, Arogyavardhini Vati, Ashwagandha-based preparations and other case-specific medicines were prescribed according to individual clinical requirements. In some patients, Kanchanar Kashaya was selected according to its classical Ayurvedic therapeutic attributes, particularly its Kaphaghna and Lekhana properties, which traditionally support its use in clinical conditions characterised by Kapha and Meda involvement [16]. From an Ayurvedic perspective, Chausath Prahari Pippali was selected based on its classical description of Dipana and Pachana, with the intention of supporting digestive function and appropriate transformation of nutrients [17,18]. This provided a rationale for its use in clinical presentations understood in Ayurveda as involving Agnimandya and impaired Dhatvagni.

Similarly, Arogyavardhini Vati was used as an adjunct therapy based on its traditional Ayurvedic rationale of supporting Dipana and Pachana and maintaining appropriate metabolic processing. Within the Ayurvedic framework, its selection was considered relevant to clinical presentations characterised by Agnimandya and impaired Dhatvagni, particularly where disturbances in lipid metabolism and hepatic function were considered part of the overall clinical picture [19-22].

Clinical evidence has indicated a possible influence of Ashwagandha on thyroid function. In a placebo-controlled randomised trial of patients with subclinical hypothyroidism, treatment with Ashwagandha root extract was associated with favourable changes in serum TSH, T3 and T4 levels [23]. These findings provide supportive background for the inclusion of Ashwagandha-containing preparations in the present cases; nevertheless, the controlled trial is not directly comparable with the observations from the present case series because of differences in study design, patient characteristics and intervention.

Jyotishmati (Celastrus paniculatus) and Shankhapushpi, traditionally classified as Medhya Rasayana drugs, were prescribed selectively in patients who exhibited mental fatigue, stress-related complaints or cognitive symptoms. The inclusion of Shankhapushpi was supported by traditional Ayurvedic descriptions and limited clinical evidence suggesting possible nootropic and memory-enhancing effects [24,25]. Jyotishmati was selected based on its traditional use as a cognitive-supportive and neuroprotective drug, supported mainly by experimental evidence [26]. However, the available clinical documentation did not include validated neuropsychological instruments, stress-rating scales or specific endocrine biomarkers for these domains, limiting assessment of the individual contribution of these formulations.

In certain cases, Kakalrakshak Yoga and other exclusively Ayurvedic formulations were employed as part of individualised care. However, the particular contribution of each formulation cannot be ascertained from the available

observations because the preparations were administered as part of individualised treatment regimens and, in some cases, in combination with other formulations.
Levothyroxine 100 µg was administered concomitantly with Ayurvedic treatment in Case IV. Consequently, the observed change in TSH in this case may reflect the combined influence of both interventions. Differences in treatment regimens, duration of therapy and concomitant medication should therefore be considered when interpreting the findings across the four cases.
In the present case series, serum TSH decreased in all four cases during the documented treatment and follow-up period, while improvement in selected presenting complaints was also documented. The magnitude of change varied between patients, and not all patients achieved TSH values within the respective laboratory reference range at follow-up. These observations describe changes occurring during the period of individualised management but do not establish that the changes were attributable to Ayurvedic treatment alone.
The interpretation of these findings is further limited by the small number of cases, variation in treatment formulations and duration, non-uniform clinical assessment and the use of concomitant levothyroxine in one patient. Nevertheless, the documented clinical and biochemical observations provide a basis for further investigation of individualised Ayurvedic approaches in patients with hypothyroidism. Future clinical studies with larger sample sizes, prospective standardised assessment, clearly defined treatment protocols, systematic monitoring of thyroid function and validated symptom measures, together with appropriate comparison groups, may help to evaluate these observations more rigorously.

Limitations
The present case series has several limitations:
- The small sample size of four patients limits the generalisability of the observations.
- The absence of a control or comparison group limits interpretation of the observed changes.
- Ayurvedic treatment regimens, formulations, doses and treatment durations varied among the patients, making comparison between cases and assessment of the contribution of individual formulations difficult.
- Clinical symptoms and laboratory parameters were not assessed uniformly across all cases, and validated symptom-rating scales were not consistently used.
- The follow-up duration and availability of investigations varied among the cases.

Ethical Considerations
Patient information was anonymised for analysis and reporting. Confidentiality was maintained throughout the preparation of the case series. Written informed consent for publication was obtained from the patients.

10.CONCLUSION
The present case series describes improvement in selected clinical features and a reduction in serum TSH levels observed during individualised Ayurvedic management in four patients with hypothyroidism. These observations provide preliminary clinical documentation of individualised Ayurvedic management in routine clinical practice. The findings should be interpreted in the context of the small number of cases and variation in treatment regimens and duration. Further clinical studies with larger sample populations and systematic outcome assessment may help to further explore these observations.

Declaration of Generative AI and Language Editing Tools:
AI-based tools were used only for language editing and improvement of manuscript readability. The clinical data, interpretation, scientific content and conclusions were generated and verified by the authors.
Conflict of Interest
Authors declare no conflict of interest.

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