All Kerala Govt. Ayurveda College Teacher's Association
KERALA JOURNAL OF AYURVEDA
An International Journal of Ayurveda Specialties

Vol 2(1): 01–05 (2023)
https://doi.org/10.55718/kja.131

CASE REPORT

Effect of *bhavitha churna* of *Mandukaparni* (*Centella asiatica* Linn. Urban) in Hyperuricemia associated with Gouty arthritis of elbow joints - A case report

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ARTICLE HISTORY

Received: 15 February 2023
Accepted: 18 February 2023

Available online
Version 1.0 : 31 March 2023
Version 2.0 : 07 April 2023

Keywords

Mandukaparni, Centella asiatica Linn. Urban, *Bhavitha churna,* Hyperuricemia, case report

Additional information

Peer review: Publisher thanks Sectional Editor and the other anonymous reviewers for their contribution to the peer review of this work.

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CITE THIS ARTICLE

Narang P, Ansary P Y, Oommen S M, Shincymol V V. Thrombo Angitis Obliterans – A Case Report. Kerala Journal of Ayurveda. 2023; 2(1): 01–05. https://doi.org/10.55718/kja.131

Abstract

Hyperuricemia is a condition caused by inadequate protein metabolism resulting exceed of serum uric acid level. According to a recent survey, hyperuricemia affects 28.94% of people worldwide. Treatment of hyperuricemia is typically based on long-term administration of hypouricemic modern medications, which can lead to additional complications. Hyperuricemia can be referred as *Amaja roga* in Ayurveda. To correct metabolism through treatment with an efficient, treatable, and safe *Ayurvedic* drug is preferable because Ayurveda places a high value on understanding metabolic disorders. Previous studies has reported hypouricemic activity of leaf and anti-inflammatory effect of methanolic extract of whole plant of *Centella asiatica* Linn. Urban. A clinical case of hyperuricemia with arthritis involving both the elbow joints along with right toe and ankle joint is being presented for the effect of *bhavitha churna* (processed powder) of whole plant of the drug *Mandukaparni.* Medicine was given at a dose of 2gm/day in the capsule form (2 capsules twice a day - 500mg/capsule). *Bhavana* involves *churna* being processed with liquid extracts to boost its potency. The treatment was conducted for three months along with one month follow-up without medicine. After the treatment, there was reduction in symptoms as patient reported with mild pain and no more swelling, tenderness and stiffness. Serum uric acid level was also reduced up to the upper limit of its normal range.

Introduction

Hyperuricemia is a common biochemically abnormal condition today brought on by faulty protein metabolism. Serum uric acid levels in healthy people range from 2 to 7 mg/dL (0.1 to 0.42 mmol/L).[1] Age and sex are related to the mean serum uric acid concentration. In males pre-puberty mean concentrations over around 3.5 mg/dL, sharply increasing to 5.2 mg/dL during puberty. The average concentration in females can reach 4.7 mg/dL, and it

typically increases after menopause.[2] Overproduction of uric acid, decreased excretion, or a combination of these issues can cause the serum uric acid levels to rise. The primary overproduction of uric acid, which occurs in the majority of cases of hyperuricemia and the decreased renal excretion of urate, which is caused by a variety of factors like alcoholism, sedentary lifestyle etc. are less common. It is also the risk factor for a number of clinical syndromes such as hypertension, lipid abnormalities, chronic kidney disease, and cardiovascular disorders. Since the 1970s, hyperuricemia has become more common, according to epidemiological studies.[3,4] The overall prevalence of hyperuricemia is around 28.94%, and men (34.53%) have a higher prevalence than women (16.51%).[1] In South India, the prevalence of hyperuricemia linked to CVD is 46.5%.[5]

In humans, the final byproduct of purine metabolism is uric acid. Degradation process of purine occur in the liver, in which nucleic acids and purine nucleotides get catalyzed to form the purine bases xanthine and hypoxanthine. With the help of Xanthine oxidase enzyme, the end conversion of hypoxanthine (a very soluble molecule) to xanthine (a less soluble molecule) and sequentially to the very insoluble compound uric acid takes place. In this way, precursors eventually contribute to form end product of 'uric acid'. The end product urates circulate in the blood plasma to be excreted.[1] Between 800 and 1200 mg/day of uric acid are accumulated from de novo synthesis, nucleotide degradation, and dietary consumption.[6] Two-third of urate formed daily is excreted by the kidneys and one-third from GI tract.[7] Uric acid is present mainly as urate (the ionized form) in physiologic fluids. At concentrations more than 6.8 mg/dL, urate ion tends to get precipitate in the form of MSU crystals. The inflammation is triggered by precipitation of these crystals in and around the joints giving rise to the symptoms such as pain, swelling, tenderness and stiffness locally.[2]

Based on analysis of *dosha* involvement in pathogenesis and symptom manifestation, aggravation of *pitta dosa* along with vitiation of localized *vata* and *kapha dosa* at the effected joints can be observed predominantly.

Mandukaparni is a significant standalone drug Ayurveda. It is mentioned as possessing *tikta rasa*, *laghu sara guna, sheeta veerya* and *madhura vipaka. Acharyas* cited it as *medya rasayana*[8,9] and it exhibit *Kaphapittahara*,[10] *Agnideepana*[11] *Sara*,[12] *Asrajita*[12] and *Rasayana,*[12,13] actions. Experimental studies on hypouricemic activity,[14] anti-inflammatory and antioxidant activities[15] of *Mandukaparni* (*Centella asiatica* Linn. Urban) have been observed by some researchers. The drug has enough potential to provide relief in inflammation. Whole plant was accepted as the useful part of the drug by API.[13] *Bhavana* is a *samskara* (pharmaceutical procedure) being used to potentiate the drug and induce additional therapeutic properties and to reduce the dose producing comparatively higher effect. This process was performed in the whole plant powder (*abhavitha choorna*) of the drug three times by soaking it overnight into its own *swarasa* (fresh juice). [16]

Table 1 : Assessment of subjective parameters

Pain - Visual Analogue Scale (VAS) of 100 mm	
Grade 0	No pain, (0-4 mm)
Grade 1	Mild pain, (5-44 mm)
Grade 2	Moderate pain, (45-74 mm)
Grade 3	Severe pain, (75-100 mm)
Swelling	
Grade 0	No swelling
Grade 1	Slightly obvious
Grade 2	Covers well bony prominence
Grade 3	Much elevated so that joint is gross deformed
Tenderness	
Grade 0	No tenderness
Grade 1	The patient says the joint is tender
Grade 2	Pain and wincing of face on pressure
Grade 3	Pain and withdrawal of affected part on pressure
Grade 4	The patient will not allow the joint to be touched
Stiffness (ROM)	
Grade 0	No stiffness With up to 25% impairment in ROM of joint and patient can perform daily work without any difficulty
Grade 1	With up to 25%-50% impairment in ROM of joint and patient can perform daily routine work with mild to moderate difficulty
Grade 2	With up to 50%-75% impairment in ROM of joint and patient can perform daily routine work with moderate to severe difficulty
Grade 3	With up to >75% impairment in ROM of joint and patient totally unable to perform daily routine work
Grade 4	

Materials and methods

Preparation of medicine

The *bhavitha churna* (powder underwent the *bhavana* process) of whole plant of the medicine was prepared in accordance with *bhavana* procedure mentioned in *Bhaishajya ratnavali*.[17] As Fine powder of the drug was soaked uniformly in its own freshly prepared *swarasa* (fresh juice), kept it undisturbed (without trituration) overnight and then next day dried under sunlight at the moderate temperature between 20 to 35 Degree Celsius. It was finely powdered to remove lumps once it had thoroughly dried. This entire process of *bhavana* was repeated for three times to avoid symptoms like headache, dizziness and drowsiness, which may arise due to drug's direct action on the CNS at a

higher dose as reported in some previous studies.[18] The clinical study was conducted using *bhavitha choorna* of *Mandukaparni* (*Centella asiatica* Linn. Urban) in capsule form.

Methodology of the study

The patient was selected based inclusion and exclusion criteria of study

Inclusion criteria

1. Participants with serum uric acid level above 7 mg/dL
2. Age group: between 18-60 years
3. Participants ready to give written consent.

Exclusion criteria

1. Participants with severe joint pain, which cannot be managed without help of pain killers.
2. Known cases of cardiovascular disease, kidney diseases, liver diseases.
3. Known cases of nephrolithiasis
4. Pregnant and lactating women.

For this pre and post intervention case study medicine were provided for 3 months. Objective parameter (serum uric acid level) was assessed through laboratory procedure before the treatment and on every 30th day up to 3 months. Subjective criteria (pain, swelling and tenderness) were assessed before the treatment and on every 15th day up to 3 months. Follow-up was taken after 1 month.

Patient information

A 34 years old married overweight male patient came in Out Patient Department of Dravyaguna Vijnana, Government Ayurveda College, Tripunithura complaining of pricking pain and swelling in right ankle joint and 1st toe mainly during walk in the morning and after sitting (5 to 10 min.) since 9 months. He also noticed pain and stiffness in both the elbow joints with restricted moments (unable to extend both the arms completely) and patient feels difficulty in performing daily routine work since one month. He also complaint of sour burps, flatulence, loss of appetite and disturbed sleep since 2 years. He did not take any medication for the above complaints. There was no history of alcohol abuse, any previous illness or surgical intervention. Psycho-social status and family history of the patient was normal.

Clinical findings

Following general, physical and systemic examinations, no additional abnormality was found, except the presence of redness, edema and tenderness on right ankle 1st metatarsophalangeal joint with up to 25%-50% impairment in ROM (range of motion) of both elbow joints. The *Dasavidha pareeksha* revealed findings like *agnimandya* and involvement of aggravated of pitta and *vata dosa*. Patient used to take seafood daily in all the meals. Serum uric acid found high (12mg/dL) in the latest blood examination. The patient was diagnosed with hyperuricemia. Before including the patient in the current study, informed consent was obtained from them.

Therapeutic intervention

Pharmacological intervention was done. Under which the patient was provided with capsules of *bhavitha churna* of whole plant of *Mandukaparni* (500mg each) and suggested to take 2 capsules with lukewarm water, twice daily after meals. The medicine was provided for 15 days. Patient was under medication for continuous three months with standard diet intake. Subjective and objective parameters were assessed on every 15th day on every 30th days respectively during three months of medication period and one month of follow-up.

Observations

Periodic assessment was done. In case of symptoms, distinguishable symmetrical reduction was noticed in the stiffness of both the elbow joints within 15 days and mobility came to normalcy (grade 0 - patient was able to do his routine work without any difficulty) after taking medicine for one month. Pain of affected ankle and metatarsophalangeal joint were turned severe to mild whereas swelling and tenderness found nil after the treatment which sustained even after 1 month of follow-up period. In addition to this beneficial effect on appetite as well as sleep quality also reported by the patient. On monthly assessment, serum uric acid level showed gradual reduction near the upper limit of it (6.8mg/dL). No adverse or unanticipated event was found during medication or follow-up period.

Discussion

Hyperuricemia being a deranged metabolic condition of purine metabolism is found to be closely related to indigestion, high purine diet, obesity and male gender. Based on its pathogenesis and symptoms manifested, hyperuricemia can be correlated with *amajaroga* and can be treated with the drugs which are capable to correct the digestion process by increasing appetite, decrease serum uric acid and cure the inflammatory symptoms.

In *amajaroga, nidana sevana* leads to indigestion of ingested food and *agnimandya* (impairment of appetite) and results in the formation of *ama anna rasa* (malformed

Assessment of subjective criteria

	Before treatment	15th day	30th day	45th day	60th day	75th day	90th day	Follow-up 1 month
Pain	3	2	2	2	1	1	1	1
Swelling	2	2	2	2	1	1	0	0
Tenderness	3	2	1	1	1	0	0	0
Stiffness	2	1	0	0	0	0	0	0

Assessment of objective criteria

	Before treatment	After 1month	After 2month	After 3month	Follow-up 1 month
Serum uric acid (mg/dL)	12 mg/dL	10.1 mg/dL	9.3 mg/dL	7.2 mg/dL	7.3 mg/dL

food content). This *ama* gets absorbed and processed under *rasadhatwagni vyapara* resulting in the formation of vitiated *rasa dhatu.* Further this *ama* gets circulated in the whole body through *rakta dhatu* and accumulates in the susceptible spots (*sthana samsraya*). Based on its nature this *ama* gets lodges in small joints (metatarsophalangeal joints) and aggravates *pitta dosa* along with vitiation of localized *vata* and *kapha dosa* at the respective joints. This ultimately leads inflammation with symptoms like *vedana* (pain), *shopha* (swelling) etc. on the affected area. *Sama dosa* (*dosas* vitiated by *ama*) can also lead improper excretion of *malas* as *anilamoodhata* and *malasanga* are the features of *sama vata* sited by *Acharyas.* Considering *samprapti vighatana* and the symptoms manifested, the main principle of the treatment for hyperuricemia can be based on *agni deepana* and *amapachana karma* of the *dravya.*

The drug *Mandukaparni* (*Centella asiatica* Linn. Urban) have been advocated as possessing *kaphapittahara*[10] *agnideepana*,[11] *pachana*, *srustavinmutra, medya*[12] and *rasayana*[12] property as per various classical *Ayurvedic* treatises. Here, *tikta rasa* of the drug might helped by its *agnideepana, aruchihara, amapacana* and *kaphapitta shosana* properties which aids in improving appetite and digestion process, pacification of *dosas* and *dhatus.* Furthermore, drug's *laghu guna* through its *langhana* property may also help in enhancing appetite and metabolic rate together with pacifying *ama* and vitiated *dosas. Sheeta veerya* of the drug might helped in acting on acidic condition of the blood and joint inflammation caused by raised due to increased uric acid concentration in blood. Also it can contribute in treating *rakta dhatu dusti* owing to the *asryaasrayee sambandha* of *pittadosa* and *raktadhatu.* The drug *Mandukaparni* (*Centella asiatica* Linn. Urban) is regarded as one of the best psychotropic drugs in *Ayurvedic* classics. Hence, with its *medya* effect the drug can improve the sleep quality of the patient. *Ama* can be understood as free radicles causing degenerative changes under moderate oxidative stressed condition in the body. The drug is cited under *rasayana dravya* (rejuvenating drugs) in *Ayurveda*. Some experimental studies revealed remarkable hypouricemic activity,[14] anti-inflammatory and antioxidant activities[15] of *Mandukaparni*. Probable mode of action of the drug can be considered based on chemical components present in the drug, such as flavonoids like quercetin and rutin, which have anti-inflammatory and antioxidant activity as well as the ability to scavenge free radicals. Saponins, phenols, tannins, and ascorbic acid are also recognized for their antioxidant effects. In addition, tannins and triterpenoids are having analgesic effects and can modulate immune responses (inflammation). Nicotinic acid can help some enzymes to work properly and can also help the digestive tract to stay healthy. In this way enhanced digestive process and inhibited ama condition may possibly justify the positive effect of the drug *Mandukaparni* (*Centella asiatica* Linn. Urban) in hyperuricemia including its signs and symptoms (pain, swelling, stiffness and tenderness) and serum uric acid level.

Conclusion

The *bhavitha churna* of *Mandukaparni* (*Centella asiatica* Linn. Urban) was capable of reducing serum uric acid and related inflammatory symptoms presented by the patient. The drug may have produced this outcome owing to its *kaphapittahara, agnideepana*, *aampachana* and *rasayana* property. So, the drug *Mandukaparni* (*Centella asiatica* Linn. Urban) is a promising drug that containing properties capable to cure symptoms (pain, swelling, tenderness and stiffness) as well as to bring down the serum uric acid level from 12 to 7.2 in three months.

Patient perspective

Patient was very happy with the outcome of the treatment, as the symptoms were relieved and serum uric acid level was remarkably reduced after completion of three months of medication period. Also, result was sustained even after 1 month of follow-up.

Informed consent

Patient's informed consent was obtained prior to begin the study.

Conflict of Interest

None

Acknowledgement

My deep respect to Dr. P Y Ansary MD (Ay) PhD, Professor and HOD, Department of Dravyaguna Vijnana, Government Ayurveda College, Tripunithura for his meticulous directions. I express my whole-hearted gratitude to Dr.Sara Moncy Oommen MD(Ay), Professor & HOD, Department of Dravyaguna Vijnana, Government Ayurveda College, Kannur for her valuable suggestions. I am grateful to Dr. Shincymol VV MD (Ay), Associate Professor, Department of Dravyaguna Vijnana, Government Ayurveda College, Tripunithura for her all time support. I would like to express my sincere gratitude to Dr. Jilu Joy MD (Ay) and Dr. Honey Thomas MD (Ay), Assistant Professors, Department of Dravyaguna Vijnana, Government Ayurveda College, Tripunithura for their constant support and help in completing this work. I would also like express my sincere gratitude to the statutory authority of Kerala University of Health Sciences, Thrissur, Kerala for the valuable support and facilities provided for the completion of the work.

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