



Case Report

Integrative management of insomnia during cancer chemotherapy: A case report

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ARTICLE INFO

Keywords:

Insomnia
Chemotherapy
Kshirabala
Case report
Integrative Oncology
Ayurveda

ABSTRACT

Introduction: Insomnia is common among cancer patients, affecting about 50% undergoing cancer treatment. Insomnia can be due to various reasons, such as physical-pain, psychological-distress and medication side-effects. Insomnia has significant impact on quality of life of cancer patients. Even-though managed with hypnotics and antipsychotic drugs, they cause dependency with various short-term and long-term complications. Presenting a case throwing light on Ayurveda topical intervention as add-on to standard-of-care in insomnia during cancer chemotherapy.

Method: A 51-year-old female patient with breast-cancer with extensive necrosis extending to subcutaneous areas was due for second cycle chemotherapy and was diagnosed with moderate-insomnia with a score of 21 as per Insomnia Severity Index in the Out-Patient-Department. Quality of sleep was assessed using Pittsburgh-Sleep-Quality-Index. Treated for 14 days during the break between cycle two and cycle three with *Shirothalam* (applied on the vertex) using *Kachuradi Churnam* with *Kshirabala 101* and *Padabhyangam* (foot massage) using *Kshirabala thailam* as add-on to Tab Zolpidem 5mg. Assessment was conducted on baseline and after 14 days of intervention.

Results: Assessment for insomnia before and after intervention was conducted with Insomnia-Severity-Index. The score improved from 21 to 2. Quality of sleep before and after intervention was assessed using global PSQI. It improved from 20 to 8.

Discussion: In Ayurveda, *Nidranasam* (loss of sleep) results from aggravation of *Vata-Pitta* (body humors responsible for movement and cognition and digestion, metabolism and heat of body), depletion of *Kapha* (body humor responsible for structural cohesion of body), derangement of *Manasika-Dosa* (mental constituents) and other diseases. All these etiological factors are attributed by *Tikshna*(sharp)- *Ushna*(hot potency) and *Ruksha*(dry) chemotherapy regimens. *Vata-Pitta-hara* (normalising *Vata* and *Pitta*) and *Indriyaprasadaka* (clearing senses) action of medicines used could induce sleep and effectively improve quality of sleep.

Conclusion: Integrative-intervention was found to be beneficial in improving insomnia and quality of sleep without any reported complications or dependency in this case. After 14 days of ayurvedic intervention, the patient could get sleep even without taking zolpidem 5mg and external therapies. Same protocol could be considered for generalization so that it could modify or reduce usage of hypnotics and antipsychotic-drugs.

1. Introduction

Insomnia is one of the most common sleep wake disorders reported by cancer patients undergoing chemotherapy [1]. It is often rarely assessed in a typical patient evaluation when other concerns, such as morbidity and mortality, appear to take precedence [1]. The cause of

chronic sleep difficulties is multifaceted and the unique contributions of side effects of chemotherapy on cancer-related insomnia cannot be ignored [2]. The sleep-inducing medications are associated with side effects and patients may develop dependency. Therefore, an alternative method to treat insomnia is essential. Due to the limited available drug-drug and drug-herb interaction studies, the administration of

Peer review under responsibility of Transdisciplinary University, Bangalore.

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<https://doi.org/10.1016/j.jaim.2024.100899>

Received 3 May 2023; Received in revised form 3 February 2024; Accepted 5 February 2024

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Ayurvedic internal medication is not feasible currently in patients receiving chemotherapy. Hence, topical intervention would be feasible and was considered (see Table 4 and 5).

In *Ayurveda*, the absence or lack of *Nidra* (sleep) is, *Asvapna* (lack of sleep) or *Nidranasa* (lack of sleep). It is enlisted among 80 *Vata-nanat-maja-roga* [3] (disease caused due to single humor responsible for movement and cognition).

Nidranasa results from *Vata-Pitta Vrddhi* (aggravation of body humors responsible for movement and cognition and digestion, metabolism and heat of body), *Kaphaksaya* (depletion of body humor responsible for structural cohesion of body), derangement of *Rajasika* (psychic attribute responsible for motion, ignorance or action) and *Tamo-Guna* (psychic attribute responsible for illusion or inactivity), *Roga* (diseases) pertaining to *Manas* (mind) and *Sharira* (body), *Dhatuksaya* (depletion of body constituents which build the basic structure and carry various physiological functions) and/or *Abhighata* [4] (injury or trauma).

Retrospectively observing the patients who receive chemotherapy, and chemotherapy drugs, we could perceive chemotherapy as very much *Tikshna* (sharp), *Ushna* (hot), *Ruksha* (rough) therapy. And the administration of chemotherapy contributes highly to *Vata Pitta Pradhana Sarvadosha Prakopanam* [5] (aggravation of all three body humors, especially *Vata* and *Pitta*) along with symptoms of *Ojo Kshaya* [6] (depletion of vitality or vigor or luster or power or bodily strength or energy). It evidently affects the quality of life and ultimately leads to *Nidranasa*. As proper *Nidra* is a contributor of balanced status of antagonistic entities like, nourishment & emaciation, strength & weakness, happiness & sorrow and short life & long life [4], it becomes a significant health concern in cancer patients undergoing chemotherapy.

An *Ayurvedic* topical intervention was selected which has the properties of *Indriyaprasadaka* (nourishing senses) and *Vata-Pitta Samanam* [5] (pacifying *vata* and *pitta*). This could correct the pathophysiology of *Nidranasa* in this condition and contribute towards the well-being during the chemotherapy.

The correction of *Nidranasa* (lack of sleep) can be achieved by *Vata-Pitta-hara* and *Kapha Sameekarana* treatment modalities and external treatments like *Murdhni Thailam* and *Abhyanga* [5]. Hence, a topical *Ayurvedic* protocol found effective clinically is selected keeping classical treatment modalities as base. *Shirothalam* with *Kachuradi Churnam* with *Kshirabala 101* and *Padaabhyangam* with *Kshirabala Thailam* are hence selected.

Sirothalam [6] is a variant of *Murdhni Thailam* developed by *Vrddha Vaidyas* of Kerala. It can be considered as a modified and concise-form of *Snigdha Sirolepa* and has been clinically observed in managing moderate to severe insomnia along with increasing the quality of sleep in the patients. *Padaabhyangam* is a type of massage confined to feet. It induces *Nidra* as well as removes exhaustion [7,8]. The *Kachuraadi Churnam* is *Vata-Pitta-hara* [9]. The *Kshirabala 101* and *Kshirabala Thailam* are directly indicated for 80 *Vatarogas* [10,11].

2. Patient information

A 51-year-old lady was diagnosed with metastatic carcinoma left breast. She was lethargic and ectomorphic in built, with a height of 150 cm and weight 43.7 kgs. She was found to have moderate disturbance in sleep after her first cycle of chemotherapy. Presenting symptoms were difficulty in initiating sleep, difficulty in maintaining sleep, frequent awakenings at night, difficulty in returning to sleep after awakening, early morning awakening and difficulty to return to sleep after early morning awakening for 8 months which aggravated severely after the first chemotherapy. She has been prescribed hypnotics intermittently for the same but could not sleep effectively. Associated complaints were weight loss, headache, fatigue, hair fall and drowsiness throughout the day. Since the patient was diagnosed to have clinical insomnia of moderate severity, the patient was managed with *Shirothalam* (application of medicated paste onto bregma of head) and *Padabhyangam* (foot

Table 1

Symptoms of patient.

Symptoms present For 3nights per week	Duration	Medications taken previously
Difficulty initiating sleep	8 months (aggravated for 1 month)	Hypnotics intermittently
Difficulty maintaining sleep		
Frequent awakenings at night		
Difficulty in returning to sleep after awakening		
Early morning awakening		
Difficulty to return to sleep after early morning awakening		

massage) as an add-on to the standard of care.

3. Clinical findings

General Appearance: Lethargic and well cooperative.

Built: Ectomorphic.

Nourishment: Poorly nourished.

BMI: 19.42 Kg/m²

Pallor: Present.

Icterus, Clubbing, Cyanosis, Lymphadenopathy, Oedema: Absent.

Details of the symptoms, duration, and medicines recommended are given below in Table 1.

4. Past medical history

The patient is a diagnosed case of CA left breast. She completed palliative external beam radiation therapy on 03/09/2021. PET CT (12/8/2022) showed primary malignancy. Most recently in 19/9/2022, she was started chemotherapy with Adriamycin and Cyclophosphamide. She was symptomatically treated for nausea, constipation and anorexia. Patient is not a known case of Diabetes Mellitus or Hypertension or any other comorbidities.

5. Family history

Patient also had no relevant family history.

6. Psychosocial history

Her diet (mixed type) included frequent meals. She was only able to take less quantity of food all the time which was often bland. She took meat and fish occasionally and egg white regularly along with other protein supplements. She had no addictions on coffee or alcohol. The patient has a sedentary lifestyle.

7. Ayurvedic examination of the patient

Dasa Vidha Pariksha (ten-fold examination of patient)

Prakrti: *Vata-Pitta*.

Sara: *Avara* (Poor)

Samhanana: *Alpabala* (Poor)

Pramana: *Hina* (sub-optimal)

Satmya: *Vyamisra Satmya* (accustomed to consumption of mixed types of foods)

Sattva: *Avara* (Poor)

Ahara Sakti [*Abhyavaharā Sakti*: *Avara* (Poor), *Jarana Sakti*: *Avara* (Poor)]

Vyayama Sakti: *Avara* (Poor)

Vaya: *Madhyama* (medium)

8. Diagnosis and pathophysiology

Insomnia is categorized as a sleep-wake disorder in the fifth edition

Table 2

Timeline of events.

Day	Medicines	Dosage	Procedure	Time	Duration
10/10/2022 to 23/10/2022	Tab. Zolpidem	5mg	Oral route	At bed time	14 days
10/10/2022 to 23/10/2022	Kachuradi Churnam + Kshirabala 101	3 gms 10drops	Thalam (medicated paste application on vertex)	7pm to 7:30pm	14 days
10/10/2022 to 23/10/2022	Kshirabala Thailam	20ml	Padabhyangam (foot massage)	7pm to 7:30pm	14 days

of *Diagnostic and Statistical Manual of Mental Disorders (DSM-5)*. The International Classification of Sleep Disorders, Third Edition (ICSD-3) criteria are consistent with the changes to the *DSM-5* [12,13]. ICD G47.01 also corresponds to insomnia due to medical conditions.

In this particular case, the diagnosis was initially made, based on the understanding of *Dosha* (body humor) predominance and *Guna* (attribute) of the aetiology. Chemotherapy results in causing *Tikshna*, *Ushna*, and *Ruksha Guna* in a patient and shares the attributes of a toxic substance (*Visa*) in the nature of action [5]. It profusely aggravates *Vata* and *Pitta*, along with the depletion of *Kapha Dosa* and *Ojas* [6]. This becomes a contributing factor for lack of sleep.

9. Therapeutic intervention

Therapeutic intervention consisted of *Ayurvedic* topical application as adjunct to the standard of care. Details of the medicines given are enlisted below in Table 2.

Thus, an integrative approach was considered. After 2nd chemotherapy, that is, during the interval of 2nd and 3rd chemotherapy, she was advised to undergo the integrative treatment for 14 days. (Duration of external therapy was decided as per the clinical practises in our institution in insomnia patients). She was given standard of care (Tab Zolpidem 5 mg [14]) and *Kachuradi Churnam* and *Kshirabala 101* for *Shirothalam* and *Kshirabala Thailam* for *Padabhyangam* for a period of 14 days.

During *Shirothalam*, *Kachuradi Churnam* mixed with *Kshirabala 101* (oil) and is applied on the vertex for 20–30 minutes. The procedure *Padabhyangam* is massage therapy which is confined to feet. *Shirothalam* with *Kachuradi Churnam* and *Kshirabala 101* was advised to be done for 30 minutes daily onto the vertex and *Padabhyangam* with *Kshirabala Thailam* was advised to be done for 15minutes on each foot. Both treatments were advised to do in the evening from 7pm to 7:30pm for 14 days. The patient and one of the patient's family members were given hands on training on the procedures by *Ayurvedic* doctor. The adherence to the self-care practice was appropriately checked over phone call daily and regularly during the time period of treatment. Before starting the treatment, quality of sleep was assessed and after 14 days, the assessment was repeated. Here it is pertinent to point out that the three medicines used in the management are all classical preparations. The medicines were purchased from a GMP certified manufacturing unit. (Table 4 and 5). *Kachuradi Churnam* being *Vatapittaharam*, *Kshirabala 101* and *Kshirabala Thailam* being indicated in *nidranasham* and is *Indriyaprasadakam* are chosen in this patient. The quality of sleep was assessed with Pittsburgh Sleep Quality Index.

Table 3

Effect on sleep measures as scales.

3a) Insomnia Severity Index Scale		
Insomnia Severity Index Scale		
Complaints	11/10/2022 (Before)	25/10/2022 (After)
Difficulty falling asleep	3 (Severe)	0 (None)
Difficulty staying asleep	3 (Severe)	1 (Mild)
Problems waking up too early	3 (Severe)	0 (None)
Satisfied with current sleep pattern	3 (Dissatisfied)	0 (Very Satisfied)
Noticeable to others	3 (Much)	0 (Not at all noticeable)
Worried/Distressed	3 (Much)	0 (Not at all worried)
Interfere daily functions	3 (Much)	1 (Not at all interfering)
Total Score	21	2
3b) Pittsburgh Sleep Quality Index Scale		
Components of Pittsburgh Sleep Quality Index Scale		
Components	11/10/2022 (Before)	12/11/2022 (After)
Subjective Sleep Quality	3	1
Sleep Latency	3	2
Sleep Duration	3	0
Habitual Sleep Efficiency	3	0
Sleep Disturbance	2	1
Use of Sleep Medication	3	3
Daytime Dysfunction	3	1
Global PSQI Score	20	8

Table 4Ingredients of *Kshirabala 101* and *Kshirabala thailam*.

Sl no:	Sanskrit Name	Scientific Name	English Name	Family	Parts used	Quantity
1	Bala	Sida cordifolia	Country mallow	Malvaceae	Whole plant	5 pala
2	Tila tailam	Sesamum indicum	Sesame oil	Pedaliaceae	Seed oil	1prastha
3	Gokshira		Cow's Milk			4prastha

10. Outcome measures and results

The severity of insomnia was assessed by Insomnia Severity Index Scale and quality of sleep was assessed by Pittsburgh Sleep Quality Index. The outcome measures ISI and PSQI were administered at baseline and at the end of 14 days of *ayurveda* topical treatment. Before treatment and After treatment values of insomnia severity index improved from 21 to 2 respectively.

ISI and PQSI scores are provided in Table 3

11. Discussion

The efficacy of any integrative intervention on insomnia during cancer chemotherapy has not been documented till now. However, the patient showed much improvement after treatment. The global score of Pittsburgh sleep quality index improved from 20 before treatment to 8 after treatment. The before treatment and after treatment values of components of Pittsburgh sleep quality index, namely subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleep medication and daytime dysfunction improved from 3 to 1, 3 to 2, 3 to 0, 3 to 0, 2 to 1, 3 to 3, 3 to 1 respectively. The patient adhered to all our instructions. There was resolution of symptoms very quickly, and there were no adverse or unanticipated events seen during this period. Associated complaints like headache, fatigue and drowsiness throughout the day was reduced as per patient (See Table 3).

The procedure *Padabhyangam* induces *Nidra* as well as removes exhaustion. The *Kachuradi Churnam* is *Vatapittaharam*, which acts

Table 5
Ingredients of *KACHURADI CHURNAM*

Sl No	Sanskrit Name	Scientific Name	Common Name	Family Name	Parts Used	Quantity used
1	<i>Sati</i>	<i>Hedychium spicatum</i>	Spiked Ginger	Zingiberaceae	Tuber	1 part
2	<i>Dhatri</i>	<i>Phyllanthus emblica</i>	Indian gooseberry	Euphorbiaceae	Fruit	1 part
3	<i>Manjistha</i>	<i>Rubia cordifolia</i>	Indian Maddar	Rubiaceae	Root	1 part
4	<i>Yasti/Madhuka</i>	<i>Glycyrrhiza glabra</i>	Liquorice root	Fabaceae	Root	1 part
5	<i>Devadaru</i>	<i>Cedrus deodara</i>	Himalayan cedar	Pinaceae	Heartwood/Oil	1 part
6	<i>Śilajatu</i>	<i>Asphaltum punjabianum</i>	Black bitumen	Mineral	Extract	1 part
7	<i>Vedhi/Hiṅgu</i>	<i>Ferula foetida</i>	Asafoetida	Apiaceae	Resin	1 part
8	<i>Rohini, Kalamegha</i>	<i>Andrographis paniculate</i>	Green chiretta	Acanthaceae	Whole plant	1 part
9	<i>Tintrinisa</i>	<i>Tamarindus indica</i>	Tamarind	Fabaceae	Leaves	1 part
10	<i>Kunkuma</i>	<i>Crocus sativus</i>	Saffron	Iridaceae	Stigma	1 part
11	<i>Karpura, Indu</i>	<i>Cinnamomum camphora</i>	Camphor	Lauraceae	<i>Niryasa</i>	1 part
12	<i>Varivaha</i>	<i>Cyperus rotundus</i>	Nut grass	Cyperaceae	Rhizome	1 part
13	<i>Rocanam</i>	<i>Mallotus philippensis</i>	Kamala tree	Euphorbiaceae	Tubers	
14	<i>Bala</i>	<i>Sida cordifolia</i>	Country mallow	Euphorbiaceae	Root, leaves, fruit	1 part
15	<i>Laja</i>	<i>Oryza sativa</i>	Puffed Rice	Malvaceae	Whole plant	1 part
16	<i>Jala</i>	<i>Coleus zeylanicus</i>	Valak	Poaceae	Seeds	1 part
17	<i>Usira</i>	<i>Vetiveria zizanioides</i>	Khas Khas grass	Lamiaceae	Whole plant	1 part
18	<i>Puskaramula</i>	<i>Inula racemose</i>	Oriss root	Poaceae	Root	1 part
				Asteraceae	Rhizome	1part

antagonistically to the pathophysiology of *Nidranasam*. The *Kshirabala 101* and *Kshirabala Thailam* are directly indicated for 80 *Vatarogas*, thereby cures *Nidranasam*.

Combination of *Kachuradi Churnam* with *Kshirabala 101* is an age old traditional clinical practise in insomnia and is clinically effective also. Both the treatments are self-care type procedures and less expensive. They do not need any hospital stay or assistance. In purview of drug-drug interaction of chemotherapy drugs with other drugs, this topical ayurveda intervention could be a solution for insomnia during chemotherapy treatment.

12. Conclusion

Despite the benefits, chemotherapy administration has various side effects, ofwhich insomnia is a common It reduces quality of sleep during chemotherapy, leading to other problems like less intake of food, increased nausea, vomiting, drowsiness, loss of weight and thus leading to lowering of dosages and thus ultimately expedite worsening of cancer. Prolonged use of many hypnotics causes various short-term and long-term complications. Hence, concurrent use of *Ayurveda* as an external therapy may be a suitable option for insomnia during chemotherapy because it avoids possible interactions between chemotherapy and internal herbal medicines.

13. Patient's perspective on treatment received

After one month after the treatment: "I had a very tough time during my treatments for cancer. The main was the sleep problem, unable to eat anything and headache. When I didn't sleep, all these difficulties were more. I used to take sleep medications as per prescriptions but never got any relief so far. This time, with *Ayurveda* medicines also, I was able to sleep without disturbances from second day of the treatment. I, myself applied the mix of powder and oil on my head at the site told. My son used to do foot massage for me. I had Allopathy Medicine also at night. All these, I did without fail for 14 days. My sleep improved very much. My usual bed time is at 9 p.m. Earlier it took around 5 hours for me to get sleep. But during this treatment, within 1 hour I was able to sleep. Before treatment I got only 2 hours of sleep. But it has increased to 8 hours. Earlier with disturbances I got up at 4 a.m. and would lie on bed without sleep till 6 a.m. Now I feel fresh when I wake up at 6am. I get continuous sleep without disturbance. Earlier I had severe tiredness and day time sleepiness. But now I wake up with satisfied sleep at night. I don't doze while reading newspaper or talking to someone. I don't feel like unfinished sleep now. Doctor said to note down every change in sleep pattern

and I did the same. I am truly satisfied with current sleep pattern.

After one year of the treatment through telephonic follow up: My chemotherapy cycles are completed. I am undergoing radiation now. My wound over left breast isn't healed. So, doctors decided to do radiation. 3 fractions over. Now going for fourth fraction. After starting radiation, I have the same sleep problems. I am not able to sleep night at all.

Source of funding

This paper did not receive any specific grant from funding agencies in the public, commercial, or non profit sectors.

Informed consent

The patient and patient's family member gave informed consent for publication.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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