Hormonal and Menstrual Change after Modification of Chronotype—An Eye Opener Treatment Strategy: A Case Report

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ABSTRACT

In urban areas, especially in adolescents, there is an increasing trend to engage in activities, which are not in compliance with circadian clock and natural rhythm of light-dark circle, turning them into a night owl chronotype. Research evidences highlight various health issues as a result of this chronotype. There are no research evidences of whether change of this night owl chronotype to lark shall correct these health issues. This is a unique case of an young unmarried lady, aged 22 years, from Lucknow, India, who visited OPD of Regional Ayurveda Research Institute for Eye Disorders (RARIED), Lucknow, with complaints of scanty menstrual flow along with hormonal imbalance, which had no improvement even after 6–7 months of medication. On probing the cause of these complaints, it was found that the patient had a night owl chronotype since past few years along with untimely food habits. The patient was then counseled for shifting the chronotype to lark along with timely food habits, which is in compliance with Ayurveda Guidelines of Lifestyle (AGOL) without any medications. After that a remarkable improvement in menstrual health was observed. Menstrual flow reached back almost to normal and the hormonal profile was balanced, with an exception to anti-Mullerian hormone (AMH), which had only a slight improvement.

Keywords: Ayurveda, Change in sleep pattern, Chronotype, Hormonal change, Hormones, Menstrual change, Modification of lifestyle.

JOURNAL OF RESEARCH IN AYURVEDIC SCIENCES (2020): 10.5005/jras-10064-0098

INTRODUCTION

Menstrual morbidities are an important reproductive health challenge for women in developing countries.¹ Circadian rhythms are the fundamental process that occur in a cyclical manner in humans. The individual’s sleep-wake cycle is mostly dictated by circadian rhythm.² The behavioral trait of preference to schedule activities for morning hours (early birds or larks) or evening hours (night owls) is called as chronotype.³ There are evidences that alteration to circadian timing is linked to metabolic ill health.⁴ Some recent evidences shows that night owls tend to die younger than early birds.⁵ The alteration in chronotype also affects hormone levels.⁶ Researches have found that sleep patterns and dietary habits have an influence on the menstrual cycle.⁷ In urban areas, individuals, often adolescents, on an increasing trend engage in activities that are misaligned with their circadian clock system and the natural rhythm of the light-dark cycle, especially sleep-awake cycle and food habits.⁸

This is a unique case report of a lady who obtained considerable change in menstrual health and hormonal levels only by adopting to a change in chronotype from night owl to lark for 2 months. This work has been reported by confining to CARE guidelines.

CASE DESCRIPTION

A young unmarried coed of 22 years who hails from Lucknow, Uttar Pradesh, had approached general OPD of Regional Ayurveda Research Institute for Eye Diseases (RARIED), Lucknow, initially on December 7, 2018 for her menstrual complaints. The patient was complaining of extremely scanty menstrual flow (only one panty liner was more than sufficient per day, which had only spotting) for 3–4 days, but regular periods of 26–28 day cycles since March 2018. The flow was decreased since April 2017 before which she had almost normal regular menstrual bleeding/cycle. She had no dysmenorrhea or discharge per vagina or any other associated complaints. Her general built was good. There was no evident family history of such complaints. The patient was an overthinker and had a stressful life. She even had considerable amount of college-related work for which she used to stay awake till late night.

Clinical Findings

Patient’s medical history starts with visit to a gynecologist in July 2017 with a complaint of small lump in her right breast. After breast examination, she was provisionally diagnosed as fibroadenoma. Sonomammography of both breasts were advised. At that time, the menstrual periods were regular with less flow. Initially, ormeloxifene was prescribed by the gynecologist. The sonomammography reported a hypoechoic mobile mass in both the breasts for which lactium was prescribed with some multivitamins. She continued...
these medications for 3 months after which the condition was cured and medication was discontinued.

Again on March 2018, the patient visited the same gynecologist with complaints of excessively scanty periods. The flow was less since her first consultation in 2017, but now it had reached to a too scanty level for which patient had approached the doctor for treatment. According to the patient, bleeding became too scanty after she had consumed the medications for the lump. She was prescribed bromocriptine and some multivitamins along with calcium and vitamin D3 tablets. She was reviewed after 1 month. But still there was no improvement in the flow. She was investigated for serum anti-Mullerian hormone (AMH), follicle-stimulating hormone (FSH), luteinizing hormone (LH), thyroid-stimulating hormone (TSH), prolactin, hemoglobin % (Hb), and random blood sugar (RBS) level. Follicle-stimulating hormone and serum prolactin were on a higher side, AMH was on a dangerously very low level, and rest were within normal limits.

The same medications were continued and in the month of May 2018; she was then prescribed levonorgesterol + estradiol. On further review after 2 months, the condition remained unchanged and hence, she was put onnorethisterone + estradiol tablets for 3 months. In the month of November 2018, as per the medical report there was only partial difference in her menstrual flow, but according to the patient, there was hardly any difference, i.e., in spite of these medications for nearly 6–7 months, the condition remained unchanged with her flow remaining too scanty (Flowchart 1).

**Therapeutic Intervention**
On thorough interrogation, it was identified that she was a night owl chronotype for past few years. Due to this chronotype, even her food habits were altered (Table 1). With reference to her previous hormonal reports and elicited detailed history of the case, a counseling session was done to bring change in her chronotype in compliance with the Ayurveda guidelines. She was not prescribed any Ayurveda medicines and all her previously prescribed medicines were stopped. The patient had almost adhered to the instructions of change in chronotype, with some difference (Table 1).

**Outcome**
The patient was reviewed after 2 months. On review, menstrual flow started increasing and started reaching her normal bleeding levels, which almost reached the state that was present few years back. The patient was initially using only one panty liner as flow was too scanty, but after change in lifestyle had started using two to three pads per day. With this appeared change in symptoms, the patient was investigated for AMH, FSH, LH, TSH, and prolactin report from the same laboratory, results of which showed an improvement in their status (Table 2).

**Discussion**
This case shows a definitive improvement in quantity of menstrual flow and hormonal profile of the patient. This case report does not demonstrate cure in the fertility level by

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**Flowchart 1: Timeline of the case**

- **April 2017**: Complaints of reduced flow started
- **March 2018**: Visited gynecologist again for too scanty periods. Flow had further decreased when compared to status in 2017. Initially was put on some medicines and was reviewed after one month.
- **July 2017**: Visited gynecologist for lump in right breast was diagnosed as fibroadenoma and was put on medications for 3 months. Condition was resolved. Stopped taking medicines after 3 months.
- **April 2018**: No improvement was seen. She was investigated for S. AMH, FSH, LH, TSH, Prolactin, Hb and RBS. FSH and prolactin was on a higher side. AMH was on a dangerously very low level and rest were within normal limits. Medicines were prescribed and continued till November 2018, but no change was seen in menstrual flow.
- **December 2018**: Visited RARIED. After taking history in detail, night owl chronotype which has been followed since few years was advised to change lark chronotype. No Ayurveda medicines were given. Asked for review after one month.
- **February 2019**: Flow started increasing. Patient was asked to follow the changed lifestyle for one more month and get S. AMH, FSH, LH, TSH, Prolactin investigated from the same laboratory where she was previously investigated.
- **March 2019**: Considerable change in hormonal levels were seen when compared to previous report in April 2018. Menstrual flow returned almost to normal quantity.
In Ayurveda, advising something that is beneficial to the health, which itself shall act as medicine, is called as Pathya (conducive regimen). In other words, advocating Pathya is itself a treatment methodology. Here, advocating AGOL (shift from night owl to lark chronotype), which is beneficial to health, is the treatment protocol or the Pathya.

Nidra (sleep) and Ahara (food) are the two important parts among the Trasopashambha (three supporting pillars of human body). Improper sleep leads to death, i.e., premature death, which has now research evidence. Nidra and Kshuda (hunger) again are 2 among the 13 Adharaneeyavega (natural impulses which should not be withheld). Healthy food habits and proper sound sleep ensure a healthy body.

In this case, improper sleeping habits and improper food habits are hypothesized to cause menstrual abnormality, infertility, and fibroadenoma-like conditions. Night owl chronotype and subsequent shift in eating habits (Vegadharana, Akalashayanojagara) may have caused derangement of the Vata-Pitta-Kapha axis, which regulates the hypothalamo-pituitary-ovarian (HPO) axis. The proper movement of Dhatu (Samyagagatha Cha Dhatunam, here Rakta Dhatu) is performed by Vata and hence here Vatavaigunya is performed. The excess Vatavaigunya, along with pitta, may have resulted in Sanga (obstruction the state of no/less output of urine, feces, sweat, or menstrual blood), which leads to extremely scanty flow (via the hormonal changes). Medicines taken for the fibroadenoma (Stanagranthi) may have acted as an Agantu factor to catalyze the above pathophysiology (Flowchart 2). Hence, change of chronotype to lark was advised for regaining health. The pathophysiology is confirmed by the presence of Upashaya (positive effect of the advice) with normalization of menstrual bleeding and hormonal profile.

Evidences show that night owl chronotypes are greater susceptible to stress. There are research evidences that stress activates the hypothalamo-pituitary-adrenal axis (HPA) that changes the reproductive hormonal profile. No research evidences are available to correlate the effect of yoga on menstrual health. Hence, correction of chronotype itself may have lessened the stress, which has made the hormonal profile to normal level.

**CONCLUSION**

This case report demonstrates effect of modification of chronotype on hormonal profile and menstrual health. Change in the hormonal profile along with increase in bleeding definitely indicates improvement in health of the young lady, even though she is still under highly infertile category. This case is not conclusive of the point that modification of chronotype to lark shall definitely bring hormonal changes and menstrual health to normalcy.

**CLINICAL SIGNIFICANCE**

This case is an eye opener to the fact that modification in chronotype from night owl to lark may be sought as a new treatment strategy to bring hormonal changes and improvement in menstrual health for patients with menstrual abnormality especially adolescents, which needs to be proved with further controlled studies.

**AUTHORS’ CONTRIBUTIONS**

Praveen Balakrishnan acquired the clinical data, took the treatment decision, and wrote the manuscript draft. D Sudhakar approved the decision. D Durshak added the final touches.
Flowchart 2: Possible pathophysiology involved in the patient

- **Nisha hetu**
  - Sitting awake at night (Late night sleep)
    - (Ratri jagarana / Nidra vega dharana)
    - Akala bhojanam / Kshut Vega dharana / Langhana
  - Agantu hetu
  - Intake of Ormeloxifene, Levonorgesterol, estradiol
  - For management of Staniagranti (fibroadenoma)
  - Obstruction (Sanga) to normal flow of menstrual blood, i.e. resulting in scanty flow

- **Untimely food/skipping meals**
  - Akala bhojanam / Kshut Vega dharana / Langhana

- Derangement of Vata-Pitta-Kapha axis that regulate the Hypothalamo-Pituitary-Ovarian axis

- Vata pradhana (V+++), Pitanubandha and kapha-possibility of Margavarana

Consent
A written informed consent was obtained from the patient for publication of this case report and any accompanying images.

References
हिंदी सारांश

क्रोनोटाइप के बदलाव से हार्मोनल एवम् मासिक धर्म प्रवृत्ति मे परिवर्तन - एक केस रिपोर्ट

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शहरी क्षेत्रों में, विशेष रूप से किशोरों में, प्राकृतिक सिरकाडियन रिदम के अनुपालन की गतिविधियों के विस्तृत में संलग्न होने की प्रवृत्ति बढ़ती जा रही है। उससे सबसे मुख्य रूप से आउल क्रोनोटाइप (सत को देर से सोना और सूबे देर से उठना) में बदल होता हुआ पाया जा रहा है। इस काल्क्रम के परिणाम स्वरूप अनुसंधान के सबूत विश्लेषन स्वास्थ्य मुद्दों को उजागर करते हैं। आयुर्वैदिक मतानुसार इस तरह के जीवनशैली से कई रोगों या मृत्यु तक हो सकती है। जिस पर आज कई अनुसंधान सबूत प्राप्त है। इस तरह के जीवनशैली को बदलकर अगर ठीक किया जाये, यानि अलिबर्ड क्रोनोटाइप (जो जल्दी सोते हैं और जल्दी उठते हैं) उससे शरीर पर होने वाले स्वास्थ्य लाभ के बारे में आज तक किसी भी प्रकार का शोधपत्र उपलब्ध नहीं है। प्रस्तुत केस रिपोर्ट यह लक्षणों के एक युगा महिला का अनोखा मामला है जिसमें जीवनशैली आउल क्रोनोटाइप से अलिबर्ड क्रोनोटाइप करने पर उनकी अत्यन्त कम हुई मासिक धर्म एवं हार्मोनल असंतुलन की समस्या में उल्लेखनीय सुधार देखा गया। प्रस्तुत केस रिपोर्ट यह दर्शाता है कि जीवनशैली के बदलाव से मासिकधर्म एवम् होर्मोनल स्वास्थ्य सही हो सकता है।