CASE REPORT

Delayed Sleep Phase Syndrome – A Case Report

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Case history

A 32-year female doctor presented with complaints of difficulty falling sleep and further questioning admitted to difficulty waking up in the morning. She admitted that she has always been a 'night owl' since her teenage, when she used to study predominantly at nights. However, this habit had persisted, in spite of specific efforts to sleep earlier and match social norms. Her sleep pattern was such that she could sleep only around 2-3 am and preferred to wake up usually around 10am. She mentioned that if she wakes around 10am, she feels refreshed and did not have any daytime sleepiness. If for any reason, she had to wake up earlier than 10 am, she felt that her sleep was inadequate and had daytime somnolence with irresistible tendency to nap.

In spite of best efforts to reschedule her work hours, she was mostly late at work, but once she reached her work place, she was able to function to her best ability. Her weight was steady at around 55 kg. She consumed 6 to 7 cups of coffee per day. She returned from work around 9pm and had dinner at about 10pm. She found her entire routine rather disturbing, as this didn't match that of her husband, who usually worked from 8 am to 6pm and slept from 11 pm to 6 am. This was affecting their interpersonal relationship and sexual life, and delaying their desire to have a child.

Upon specific questioning she admitted that she was frustrated about tossing and turning in bed from midnight till her sleep time. She prescribed herself Alprazolam but felt that this did not help in any way but only caused a 'hangover' the following day.

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After reviewing her history and sleep diary for two weeks, it she was diagnosed to have delayed phase sleep syndrome and was given specific advise to gradually advance her wake up time and sleep time by 15 to 30 minutes every two weeks. Phototherapy and scheduled wake up time were advised along with standard sleep hygiene measures. Although she had marginal improvement after about two months, she specifically requested to hasten the process if at all possible medically. After explaining in detail about value, limitations and the need for appropriate timing of medication, she was agreeable to a trial of Melatonin (3 mg). After about 3 months of therapy with this combination of behavioral, phototherapy and pharmacotherapy, her sleep onset time was approximately mid night with a wake up time of 7am. She and her family, found this routine significantly more acceptable. Subsequently, Phototherapy & Melatonin have been stopped and she is able to maintain this routine with behavioral therapy only.

Discussion

Delayed sleep phase syndrome (DSPS) is a disorder of circadian rhythm in which the body's internal clock is not in synchrony with socially accepted sleep-wake patterns. Such patients typically describe themselves as "owls" or "night people" and say they feel and function best during the late evening and night hours.

Patients frequently present with sleep-onset insomnia, similar to the one described in our report. DSPS is reported to be responsible for 7-10% of cases of chronic insomnia [1]. Unlike most other insomniacs, however, they fall asleep at about the same time every night, no matter what time they go to bed. However, most of these patients get inappropriately labeled as chronic psycho physiological insomnia. Depression or other psychiatric problems may develop in about half of the adult DSPS patients, which is about the same for people with other forms of insomnia. A striking relationship

has been found between circadian rhythms and psychiatric disorders, particularly seasonal affective disorder, primary depression, and bipolar affective disorder.[2] It is not uncommon to see them after being unsuccessfully treated with antidepressants, anxiolytics or sedatives. They often describe sleeping pills in normal doses as having little or no effect in helping them fall asleep. Sometimes the pills only aggravate the daytime symptoms of difficulty awakening and sleepiness like seen in our patient.

Although it can present at any age, there appears to be an increased prevalence (7%) in the adolescent age group. A family history of DSPS is noted in about 40% of people with the disorder. It can develop suddenly or insidiously. Patients are usually perplexed that they cannot find a way to fall asleep more quickly. Their efforts to advance the timing of sleep onset such as going to bed early, having a friend or family member wake them up in the morning, trying relaxation techniques is usually unsuccessful.

Pathophysiology

DSPS is a disorder of the biological clock. It is believed to be caused by a reduced ability to reset the body's sleep-wake clock in response to time cues in the person's environment. Individuals with DSPS might have an unusually long circadian cycle, or might have a reduced response to the re-setting effect of light on the body clock. Other markers of the circadian cycle, such as body temperature and plasma melatonin levels, also show normal but delayed timing. Non-dipping blood pressure patterns are also associated with DSPS when present in conjunction with socially unacceptable sleeping and waking times [3].

In most patients with DSPS, it is unclear what causes the abnormality in the biological clocks. DSPS tends to run in families [4] and a growing body of evidence suggests that the problem is associated with the *hPer3* (human period 3) gene [5]. There have been several documented cases of DSPS and non-24 hour sleep-wake syndrome developing after traumatic head injury. [6] [7]

Treatment

Treatment for delayed sleep phase syndrome is aimed at rephasing the patient's circadian rhythm and sleep pattern. The ultimate goal is to synchronize the sleep pattern to the demands of lifestyle, school, and employment and to allow the patient to wake up at a given time feeling refreshed and functional. Adolescence appears to be the most common period of life for the onset of DSPS, but childhood cases have been reported. Although, clinical presentation and diagnosis may be delayed, it should be noted that it is rare for symptom onset after the age of 30 [8]. Treatments include phototherapy with a full spectrum bright lamp set on a timer, and chronotherapy. Bright light therapy takes total control of light and dark exposure across the whole day. It is important to ensure bright light exposure early in the morning and avoid light late in the evening. This helps to produce a phase advance over a period of time. Chronotherapy is a behavioral technique in which bedtime is systematically delayed, which follows the natural tendency of human biology. Bedtime is delayed in small increments each day, establishing up to a 27-hour day. The procedure is maintained until the desired bedtime is reached, (say 11 p.m.) when the normal 24-hour day is then established. This can be very difficult without full co-operation from the patient.

Chronobiotics like Melatonin[9] have been successfully used for treating circadian rhythms, although not in all patients. It is a ubiquitous molecule and widely distributed in nature, with functional activity occurring in unicellular organisms, plants, fungi and animals. In most vertebrates, including humans, melatonin is synthesized primarily in the pineal gland and is regulated by the environmental light-dark cycle via the suprachiasmatic nucleus. Pinealocytes function as 'neuroendocrine transducers' to secrete melatonin during the dark phase of the light-dark cycle and, consequently, melatonin is often called the 'hormone of darkness'. Melatonin is exclusively involved in signaling the 'time of day' and 'time of year' (hence considered to help both clock and calendar functions) to all tissues and is thus considered to be the body's chronological pacemaker or 'Zeitgeber'. It is unclear what the optimal dose of melatonin would be for therapeutic use. Most clinical trials have used small doses (1mg)[10] a few hours before bedtime and concluded that it may be helpful in establishing an earlier pattern, especially in conjunction with bright light therapy [11] at the time of awakening. Melatonin advances the circadian clock and sleep in patients with DSPS in a phase-dependent manner [12]. Successful use of melatonin's chronobiotic properties has been reported in other sleep disorders associated with abnormal timing of the circadian system including jetlag,

shift work sleep disorders and phase advance in elderly [13]. Side effects of melatonin may include disturbance of sleep, daytime sleepiness and depression. The long-term effects of melatonin administration have not been examined In some countries the hormone is available only by prescription or not at all. Some claim that large doses of vitamin B12 help normalize the onset of sleepiness, but little is known of the effectiveness of the treatment.

A treatment option which shows promise is Ramelteon, a recently-approved drug which in some ways acts as a synthetic melatonin. Modafinil is approved in the USA for treatment of Shift-work sleep disorder (SWSD), which shares some characteristics with DSPS, and a number of clinicians are prescribing it for DSPS patients. Forcing a patient to go to sleep early, for example by the use of sedatives or "sleeping pills", and forcing early rising does not result in adaptation to the new sleeping pattern. Most sufferers report that sedatives are ineffective and can even exacerbate the problem.

DSPS patients who also suffer from depression should seek treatment for both problems. There is some evidence that effectively treating DSPS can improve the patient's mood and make antidepressants more effective. In addition, treatment for depression can make patients more able to successfully follow DSPS treatments.

Lack of public awareness[14] of the disorder contributes to the difficulties experienced by DSPS patients and their families. Parents may find themselves chastised for not giving their children acceptable sleep patterns, and schools are generally uncooperative in helping children. Children may be inappropriately treated for insomnia and even ADHD or ADD. People with DSPS are commonly stereotyped as undisciplined or lazy.

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