

Grand Rounds at the Clinical Center of the National Institutes of Health

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Diagnosis and Treatment of Seasonal Affective Disorder

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SELECTED CASE

A 39-year-old novelist presented in October complaining of increasing fatigue and severe "writer's block." For a month she had found it increasingly hard to wake up and get going in the morning. Her energy level was low; she was unable to concentrate on her writing and had trouble meeting deadlines. She had gained 2.25 kg and had difficulty avoiding deserts and high-calorie snacks. Whenever possible, she would nap at her desk or "vegetate" in front of the television. Bills went unpaid, and laundry piled up. She felt "disgusted" at her "incompetence" and pessimistic about the future.

A review of her history revealed that from her college years she had had similar difficulties, beginning in fall and winter and lasting until spring. For the last few winters, these episodes had been getting worse. During the spring, she would feel "alive again"—unusually energetic and euphoric, highly productive, and needed little sleep.

During the winter, the patient had been repeatedly tested for various physical ailments such as infectious mononucleosis, hypothyroidism, and hypoglycemia, all with negative results. On one occasion she was diagnosed as suffering from depression and was treated with amitriptyline, but she couldn't tolerate the resulting drowsiness and dry mouth and discontinued the medication after a week. For much of her life, her mother had also suffered from recurrent depressions that occurred predominantly in the winter. One

maternal uncle was an alcoholic. The patient had no history of any ophthalmologic difficulties, and physical examination and results of routine blood tests were all normal.

The patient was diagnosed as suffering from seasonal affective disorder (SAD), and light treatment was initiated. She was instructed to sit 45 cm away from a standard 10 000-lux light box, slanted at a 45° angle toward her face, for 30 minutes each morning. She was asked to face the box and glance at it periodically but not to stare at it. Rather, she was encouraged to read or do paperwork to use the time to good effect. Within a week, she reported feeling more energetic and cheerful. Words and ideas came more easily to her, and she was able to return to work on her latest novel. She did, however, complain of continued difficulty waking up on time in the morning.

The patient was then instructed to set a bright bedside lamp on a timer to go on 2 hours before she was due to arise. She was also encouraged to start a regular exercise program, which included walking outdoors at lunch time, and to glance intermittently at the sky (but not directly at the sun). Within a few weeks, she reported feeling almost completely well. She remained well throughout the winter, although in January and February it became necessary to increase the duration of light treatment to 45 minutes in the morning plus 30 minutes in the evening. With the approach of spring, it was possible to decrease and eventually discontinue her light treatment and she remained well, without treatment, through spring and summer. In early September she will resume light therapy, put the bedside lamp on the timer, and begin her exercise routine again in an attempt to prevent the development of her winter symptoms.

COMMENT

This patient's clinical and demographic features are typical of winter SAD¹ (Table). The concept of SAD has been included in the most recent *Diagnostic and Statistical Manual of Mental Disorders, Revised Third Edition* of the American Psychiatric Association as "seasonal pattern," an adjectival modifier of any form of seasonally recurrent mood disorder.² The presence of a combination of depressed mood and a characteristic cluster of physical symptoms, distinguishes SAD and other depressive syndromes from ordinary sadness.² In most clinical samples, women outnumber men by three to one.³ In this regard, one Japanese study was an exception in that researchers found an equal male-to-female ratio.⁴

The tendency to experience seasonal changes in mood and behavior, also known as "seasonality," is manifested to different degrees in different individuals, ranging from the extreme and pathological end of the spectrum, namely patients with SAD, through the mildly pathological, as in subsyndromal SAD (S-SAD), to the normal. Criteria have been developed to differentiate these categories in epidemiological studies.⁵ The prevalence of SAD in the United States has been found to increase with increasing latitude and has been estimated to range from 1.4% in Florida to 9.7% in New Hampshire.⁶ Estimates of the prevalence of SAD in those suffering from recurrent mood disorders range from 10% to 38%.⁷⁻¹⁰ Epidemiological studies have found that women report more seasonality than men, suggesting that the preponderance of female patients in clinical samples may represent more than a sampling bias.^{5,6} The basis for this greater putative vulnerability of women to the effects of the changing seasons is

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Clinical and Demographic Features of Seasonal Affective Disorder (SAD) (N=467)

Age, y	38.9±9.7
Age of onset, y	23.1±10.6
Sex ratio (female to male)	3.7:1 (367:100)
Length of depressions, mo	4.9±1.4
Symptoms of SAD, % of patients	
Decreased activity	95
Mood	
Sadness	97
Anxiety	87
Appetite	
Increased	66
Decreased	17
Carbohydrate craving	72
Weight	
Increased	74
Decreased	8
Decreased libido	64
Increased sleep duration	77
Other	
Symptoms milder nearer equator	83
Menstrual mood difficulties	61
Work difficulties	86

not well understood, but it may be hormonally based, as it increases after puberty and decreases in the postmenopausal years, and older women report low levels of seasonality.^{5,11,12}

The patient's tendency to overeat, feel fatigued and lethargic, oversleep, crave carbohydrates, and gain weight—depressive symptoms that have been designated "atypical" in the literature on depression—are actually common in SAD, although a significant minority of patients report the more "typical" vegetative symptoms of eating less, sleeping less, and losing weight (Table). The prolonged duration of the depressions (5 months on average) distinguishes these depressive episodes from the so-called holiday blues, a short-lived psychological reaction to stresses that typically occur around the holiday season.¹³

The original diagnostic criteria for SAD emphasized that the recurrent depressive symptoms should not be attributable to a seasonally recurring psychosocial variable. There is no evidence that such seasonal stresses are involved in the present patient's winter depressions, or that they are of primary importance in explaining the symptoms of most SAD patients,⁷ though they may aggravate the depressing effects of light deprivation.

Despite the presence of physical symptoms, physical examination and laboratory studies are routinely normal in SAD; the diagnosis of the condition therefore rests on patterns in the patient's history. A family history of mood disorders, alcohol abuse, and SAD itself is common in patients' first-degree relatives, and a recent Australian twin study suggests that seasonality is to some degree an inherited trait.¹⁴

Light deprivation is etiologically important in SAD, and while it occurs most commonly as a result of the short, dark days of winter, it may also be due to dark indoor working environments, un-

seasonable cloudy spells,¹⁵ or ocular difficulties.¹⁶ It is important for the clinician to bear in mind these alternative causes of light deprivation in order to diagnose SAD when it occurs out of season and to devise optimal ways to correct the problem.

For many patients with SAD, light therapy should be regarded as a first-line treatment, given its high success and acceptance rate.^{17,18} There is disagreement as to the importance of ophthalmologic examinations before light therapy is initiated. Some researchers have argued strongly in favor of such examinations,¹⁸ whereas others have questioned their value.¹⁹ Researchers agree, however, that it is important to take a good ophthalmologic and medication history and exclude, or obtain consultation on, patients with retinal problems. It is also important to inquire about photosensitizing agents the patient may be taking, because these may enhance the toxic effects of light on the retina.¹⁸

The type of light therapy used in this patient's case is standard at this time, the 10 000-lux intensity having been shown to be more effective than the 2500 lux used in the earliest studies.²⁰ Ordinary white fluorescent light appears to be satisfactory. "Full-spectrum" lights that mimic the spectral distribution of sunlight more closely than regular fluorescents do not appear to have any special advantage, nor is ultraviolet light a necessary spectral component. Given the potential danger of ultraviolet light to both the eye and the skin, it is prudent to use fixtures or lamps that screen it out as much as possible. While the type of fluorescent lights found to be effective in trials of light therapy have not differed from those used for ordinary indoor lighting, the intensity to which the subject using the fixtures is exposed, at 10 000 lux, is approximately 20 times as great as that of ordinary indoor lighting. Those patients who ask whether their symptoms could be effectively treated by replacing the light bulbs in their homes and offices are thus missing an essential point—namely, that the intensity is far more important than the type of fluorescent light used. Although the effects of light therapy are frequently seen within the first week of treatment,^{1,3} recent evidence suggests that this antidepressant effect may increase over several weeks.²¹ It would therefore seem premature to abandon light therapy if a patient with SAD fails to respond within the first few weeks of treatment. Some response would be expected, however, within the third or fourth week.

One of the most controversial questions about the administration of light therapy relates to the optimal time of

day for administering the treatment. While some researchers have shown light therapy administered on arising in the morning to be superior to evening treatments,^{22,23} others have found the therapy to be useful even if administered at times of the day other than the morning hours.^{3,4,24,25} Some have argued that the fundamental abnormality in SAD patients may be delayed circadian rhythms and that light treatment administered in the morning may correct this abnormality by advancing these rhythms to a more normal phase position.^{22,23} The discrepancy in these findings may be explained in part as a result of an ordering effect.²⁶ Indeed, all studies in which morning light was found to be superior to evening light used a crossover design.²⁵ It appears that evening light treatment may be inferior to morning light treatment only when it is administered as the second treatment condition after a course of morning light therapy has previously been administered. In one recent study in which morning light and evening light were compared in a parallel design, no differences emerged between these two timing regimens.²⁵

A survey of usage patterns among SAD patients formerly treated in a research program found that about half of them continued to use light therapy in both the morning and the evening and that the remainder were divided about evenly between those who used it only in the morning and those who used it only in the evening.²⁷ Because scheduling problems are a common cause of noncompliance, and given the evidence that light therapy is probably equally effective in both morning and evening, it is reasonable to suggest that a patient start light therapy at whatever time of day is most convenient, and to shift to another time of day only if the antidepressant response is inadequate. Another strategy for improving response is to increase the duration of treatment, which was helpful in the present case.

While light therapy is often free of side effects, the more common ones include headaches, eyestrain, irritability, and insomnia, the last particularly if treatments are administered late at night.²⁷ These latter symptoms may be part of a hypomanic or even manic episode induced by too much light exposure, though a full-blown hypomanic episode is a rare complication of light therapy for SAD. When side effects occur, they are almost always mild and can generally be handled by decreasing the duration of treatments or by having the patient sit a little farther from the light source.

The improvement experienced by the above-mentioned patient after she put her bedside lamp on a timer is consis-

tent with a report that hypersomnia can be assisted by a light left on in the bedroom overnight.²³ In an attempt to simulate dawn, researchers have treated SAD patients with an electronic device that can be connected to a bedside lamp or other light source programmed to create an artificial dawn with designated rate of onset and duration.^{29,30} They found the simulated dawn to have antidepressant effects even though the patients were asleep while being treated, and the final intensity (250 lux) was considerably lower than that required for conventional light therapy.^{29,30}

Although anecdotal evidence supports the value of stress management, exercise, and exposure to outdoor light in winter depression,¹³ controlled studies of these factors have not yet been performed in SAD patients. This patient's plans to take precautionary measures next winter are well advised. In fact, some researchers have suggested that light treatment administered early in the winter may have continuing beneficial effects throughout the rest of the season,³¹ although others have disputed this finding.³²

The exuberance experienced by this patient in the spring is commonly seen in those with SAD¹ and may reflect an exaggeration of the improved mood observed in the general population at this time of year.³³ Such periods of elation are generally not a problem for these people and do not usually warrant the type of clinical intervention indicated for manic episodes. On the contrary, creative individuals frequently report periods of elevated mood and enhanced energy, occurring most often in spring and fall, which they regard as important or even vital to their productivity.³³

Although many controlled studies of light therapy for SAD have been undertaken, there have been only five controlled medication studies undertaken to date. Two studies of serotonin agonists suggest that these may be useful in the treatment of SAD. In the one instance d-fenfluramine (which is not yet commercially available in the United States) was found to be superior to placebo³⁴; and in the other fluoxetine, 20 mg/d, was found to be as effective as light treatment.³⁵ The positive findings in these two studies are consistent with evidence of abnormal behavioral and hormonal responses to the serotonin agonist, m-CPP, in SAD patients, which are normalized following effective light therapy.^{36,37}

Although there is no consensus at this time as to the etiology of SAD, deficient brain serotonergic transmission has been postulated to be part of its pathophysiology for several reasons.^{36,38} These in-

clude the observation that hypothalamic serotonin concentration varies with the seasons, with minimum concentrations occurring during the winter months.³⁹

In a third controlled study of medications for SAD, the β -adrenergic blocking agent atenolol was compared with placebo.⁴⁰ Since drugs of this class block the secretion of melatonin from the pineal gland, this study was undertaken to test the hypothesis that melatonin secretion is responsible for the symptoms of SAD.⁴¹ In general, atenolol was not superior to placebo, and the melatonin hypothesis has not been fully supported.^{40,41} In a more recent study of propranolol, administered in the morning to SAD patients, researchers found that switching to placebo was followed by relapse to a greater degree than continuing the drug, thus suggesting that melatonin may yet have a role in the pathogenesis of SAD.⁴² In two other controlled studies—of levodopa plus a dopa decarboxylase and of vitamin B₁₂—the drug was found to be no better than placebo⁴³ (and oral communication, Dan A. Oren, MD, National Institute of Mental Health, April 30, 1993).

If light therapy is unsuccessful in alleviating a SAD patient's depressive symptoms or unacceptable for some other reason, it would be reasonable to try a selective serotonin reuptake inhibitor (SSRI), such as fluoxetine (Prozac), sertraline (Zoloft), or paroxetine (Paxil). Although antidepressants other than the SSRIs have not been systematically studied in SAD, there is no reason to suppose them to be ineffective. One recent uncontrolled study, for example, suggests that the relatively novel antidepressant bupropion is effective for SAD.⁴⁴ Both the SSRIs and bupropion are logical choices for the treatment of SAD because they produce fewer anticholinergic side effects than most other antidepressants and may be associated with decreased appetite, weight loss, and increased energy—all welcome effects for SAD patients. Clinical experience suggests that using medications in combination with light therapy frequently results in better symptomatic improvement than either treatment alone. In addition, it may be possible to get by with lower dosages of medications and therefore fewer side effects.

CONCLUSIONS

The diagnosis of SAD should be considered in all patients presenting with nonspecific complaints such as lethargy and fatigue, especially during the fall and winter months. The diagnosis is based on the patient's history; special investigations are invariably uninformative. Treatment with bright environmen-

tal light is generally a first-line therapeutic approach,^{17,18} but other treatments including antidepressants, stress management, exercise, and psychotherapy may be useful too.¹³ Neither the etiology of SAD nor the mechanism of the antidepressant effects of light are well understood, and both areas are the focus of ongoing research.³⁸

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