

BRIEF REPORTS

Side Effects of Light Therapy in Seasonal Affective Disorder

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The authors report the frequency of side effects of light therapy in 105 patients with seasonal affective disorder treated with three intensities of light. Common symptoms to emerge during treatment were headache (19%), eyestrain (17%), and feeling "wired" (14%). There was no relationship between side effects and intensity of light used.

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Light therapy has become accepted treatment for patients suffering from seasonal affective disorder (1, 2). However, very little is known about its potential short- or long-term side effects (3). To our knowledge, only one study to date has specifically addressed the issue of side effects (4). Oren et al. (4) found eyestrain (26%), headache (25%), and insomnia (24%) to be most common. However, the patients in this study had been using lights with unspecified duration and intensity. The possible side effects from a standard 2-week course of light therapy and the effects of different intensities of light on side effects are still unknown. Therefore, we evaluated the occurrence of side effects in patients receiving three different intensities of light over a 2-week period.

METHOD

The details of the methodology of this study have been presented elsewhere (5). Subjects were 118 outpatients, 20 men and 98 women, who gave informed consent and fulfilled either DSM-III-R criteria or Rosenthal's criteria (1) for major depression, seasonal subtype. Patients were recruited from centers in five cities: Toronto; Bethesda, Md.; Vancouver, B.C.; Boston; and Salt Lake City. Patients with bipolar and unipolar depression who had not had light therapy for at least 2 weeks were included if they met the severity criteria of the Hamilton Depression Rating Scale, Seasonal Affective Disorders Version (6). Subjects were excluded if they had any ophthalmological conditions that would preclude the use of light therapy.

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Protocol

The study was conducted over a 4-week period during the months of November 1990 to March 1991. Before commencing light therapy with a light visor (BioBrite) the patients were asked to complete the Light Visor Side Effects Questionnaire, developed by a group at the National Institute of Mental Health (4; unpublished work of Moul et al.), which required patients to rate, on a scale of 0 to 3 (0=not at all, 1=mild, 2=moderate, 3=severe), the degree to which they experienced 10 symptoms thought to be common side effects of light therapy (4, 7). Following 2 weeks of light therapy, the Light Visor Side Effects Questionnaire was readministered and the patients were asked to report whether current symptoms were attributable to use of the light visor. Patients were randomly assigned to one of three intensities of light and wore the visor for half an hour every morning for 2 weeks. The light bulbs were incandescent with intensities of approximately 60 lux (range=55-118 lux, mean=66.6), 600 lux (range=520-762 lux, mean=620.1) or 3,500 lux (range=2,800-4,470 lux, mean=3524.4). The Hamilton Depression Rating Scale, Seasonal Affective Disorders Version, was given again after 2 weeks of light therapy, and response was determined by a 50% reduction in the total score.

Statistical Analysis

Change in symptom score was determined by subtracting the pretreatment score on each symptom of the Light Visor Side Effects Questionnaire from the posttreatment score. Therefore, the worsening of a symptom was defined by a positive score and the emergence of a side effect by a change from pretreatment score from 0 to any positive number. Improvement was defined as a negative score, and the remission of a symptom was defined by a negative score if the posttreatment score was 0. Our theoretical position, and our clinical experience with the scale, suggested that the relationship between scores on the scale was more likely interval than ordinal. Therefore, we chose to analyze the data using parametric tests. Multiple analysis of variance (MANOVA) was used to test the effects of intensity and treatment response on the change in symptom scores on the Light Visor Side Effects Questionnaire according to a three (intensities) by two (treatment response) design with the 10 change scores for symptoms on the Light Visor Side Effects Questionnaire as dependent variables.

RESULTS

Although 118 patients began the course of light therapy, 13 patients dropped out, three as a result of side

TABLE 1. Subjects With Seasonal Affective Disorder Whose Scores on the Light Visor Side Effects Questionnaire Changed After 2 Weeks of Light Therapy (N=105)

Symptom	Change in Symptom									
	Worsened		Emerged				Improved		Remitted	
	N	%	N	%	Patient Attributed Emergence to Light Visor		N	%	N	%
Abdominal pain	7	7	5	5	0	0	26	25	24	23
Dizziness	13	12	12	11	6	6	12	11	12	11
Eyestrain	22	21	18	17	9	9	19	18	15	14
Fatigue	6	6	4	4	0	0	63	60	41	40
Feeling "wired"	16	15	15	14	10	10	21	20	15	14
Headache	27	26	20	19	10	10	39	37	29	28
Insomnia	14	13	11	10	3	3	38	36	31	30
Muscle pains	16	15	11	10	2	2	34	32	28	27
Nausea	15	14	14	13	5	5	10	10	10	10
Sweaty	2	2	2	2	0	0	12	11	12	11

effects—headaches (one receiving 60 lux and one receiving 600 lux) and hypomania (a patient receiving 600 lux). Thirty-three patients receiving 60 lux, 38 patients receiving 600 lux, and 34 patients receiving 3,500 lux completed the study. These 105 patients completed the Light Visor Side Effects Questionnaire at both baseline and week 2. Their demographic information is available elsewhere (5). There were no significant differences in age or sex ratios across the five sites or across the three light intensity groups. There were also no differences in demographic profile or mean Hamilton Depression Rating Scale, Seasonal Affective Disorders Version, score between patients who were diagnosed according to Rosenthal or DSM-III-R criteria. Mean baseline Hamilton Depression Rating Scale, Seasonal Affective Disorders Version, score for the whole group was 18.7 (SD=5.5) for typical and 13.6 (SD=4.4) for atypical symptoms.

Table 1 presents the number of patients in whom symptoms worsened, emerged, improved, or remitted, based on the change scores for each symptom on the Light Visor Side Effects Questionnaire. The numbers of patients who attributed the emergence of side effects to the use of the light visor are included in the table. The most common symptoms to emerge were headache, eyestrain, feeling "wired," and nausea. About half of the patients who experienced these side effects attributed their emergence specifically to the use of the light visor. When we considered only the patients who experienced an increase to moderate or severe symptoms, only the symptoms of headache, feeling "wired," and muscle aches or pains occurred in more than 5% of subjects. A total of 112 emergent side effects were reported. At least one side effect emerged in 58% (N=61) of the patients, at least two side effects in 30% (N=32), and at least three in 13% (N=14). Symptoms that commonly remitted were fatigue, insomnia, headache, and muscle aches or pains.

Using MANOVA, we found no significant effect of intensity (Wilks's lambda=0.83, hypothetical df:error

df=20:180, n.s.), response to treatment (Wilks's lambda=0.84, hypothetical df:error df=10:90, n.s.), or their interaction (Wilks's lambda=0.72, hypothetical df:error df=20:180, n.s.) on change in symptoms.

DISCUSSION

We systematically evaluated side effects that occur during light therapy. By evaluating the baseline rates of the symptoms we were able to assess the proportion of patients in whom side effects emerged. The most common symptoms to emerge during light therapy were headache, eyestrain, feeling "wired," and nausea, which is in keeping with the results of the retrospective study of Oren et al. (4). About half of our subjects attributed these effects to the use of the light visor, and headaches led to discontinuation in two patients in the study (10% of those who developed headaches overall). However, the data also demonstrate that most patients experienced a reduction in these symptoms during treatment. Therefore, patients with seasonal affective disorder who experience headaches or insomnia as part of their illness should not necessarily be discouraged from using light therapy.

There was no difference in change in side effects across the three intensities of light, suggesting that side effects may not be intensity-dependent. However, these results may be specific to the light visor, and generalization to other technologies may not be warranted. Of note, one patient, who had no history of definite hypomanic episodes, developed hypomania, whereas none of the patients diagnosed with bipolar disorder developed manic symptoms.

To fully establish the safety of light therapy, it is essential to evaluate both short-term side effects and long-term side effects as well as potential toxic effects of light therapy on the eye (3). There are few data available on these aspects of clinical care for patients with seasonal

affective disorder (3). Since the numbers of patients being treated with light therapy are increasing, there is an urgent need for more study in this area.

REFERENCES

1. Blehar MC, Lewy AJ: Seasonal mood disorders: consensus and controversy. *Psychopharmacol Bull* 1990; 26:465-494
2. Terman MT, Terman JS, Quitkin FM, McGrath PJ, Stewart JW, Rafferty B: Light therapy for seasonal affective disorder: a review of efficacy. *Neuropsychopharmacology* 1989; 2:1-22
3. Terman M, Reme CE, Rafferty B, Gallin PF, Terman JS: Bright light therapy for winter depression: potential ocular effects and theoretical implications. *Photochem Photobiol* 1990; 51:781-792
4. Oren DA, Shannon NJ, Carpenter CJ, Rosenthal NE: Usage patterns of phototherapy in seasonal affective disorder. *Compr Psychiatry* 1991; 32:147-152
5. Joffe RT, Moul DE, Lam RW, Levitt AJ, Teicher MH, Lebegue B, Oren DA, Buchanan A, Glod CA, Murray MG, Brown J, Schwartz P: Light visor treatment for seasonal affective disorder. *Psychiatry Res* (in press)
6. Terman M, Williams JBW, Terman JM: Light therapy for winter depression, in *Innovations in Clinical Practice: A Source Book*, vol 10. Edited by Keller PA. Sarasota, Fla, Professional Resource Exchange, 1991
7. Rosenthal NE, Sack DA, Gillin C, Lewy AJ, Goodwin FK, Davenport Y, Mueller PS, Newsome DA, Wehr TA: Seasonal affective disorder: a description of the syndrome and preliminary findings with light therapy. *Arch Gen Psychiatry* 1984; 41:72-80