CASE REPORT

THERAPY AUGMENTATION BY BRIGHT LIGHT TREATMENT FOR NON-SEASONAL DEPRESSION OF ADOLESCENTS

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Abstract

Objective: bright light therapy is reported to be effective augmenting antidepressive therapy of adults (Tuunainen et al. 2004).

Method: we treated two male causasian depressed adolescents, 14 and 17 years old, with placebo (dim white light, 50 lux) for one week and then for another week with bright white light (2,500 lux) (one hour a day in the morning from 09:00 to 10:00 a.m.). Melatonin saliva samples were collected at 08:00 a.m. and 08:00 p.m., 1 week before and one day before placebo treatment, on the day between placebo and verum treatment,on the day after verum treatment and one week after verum treatment and assayed for melatonin to observe any change in circadian timing. Beck's depression inventory (BDI) scales were administered.

Results: both patients experienced mood improvement. BDI scores improved 5 points. There were no significant treatment effects or time-by-treatment interactions. No significant adverse reactions were observed. The assays of saliva showed significant differences between treatment and placebo.

Conclusions: response to bright light treatment in this age group was superior to placebo.

Key Words: bright light therapy, melatonin, depression, adolescents

Declaration of interest: the authors declare that they have no competing interests.

Abbreviations:

BDI	Beck depression inventory
SAFTEE	Scale for Assessment for Treatment Emergent Events

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Introduction

Antidepressant drugs are reasonably effective treating psychiatric disorders in adolescents, but depression often is inadequately treated.

Light treatment for seasonal depression has become accepted in the Clinical Practice Guidelines issued by the U.S. Department of Health and Human Services (Depression guideline panel 1993) and the American Psychiatric Association's *Treatment of Psychiatric Disorders* (Rosenthal 1995). A light treatment study demonstrates that light is effective for nonseasonal depression (Tuunainen et al. 2004). In nonseasonal depression, light treatment may produce as much incremental benefit or more when antidepressant drugs are also administered (Lewy et al. 1998).

There is evidence that morning light is better than evening light for seasonal depression (Terman et al. 1989, Sack et al. 1990, Avery et al. 1991, Terman et al. 2001), but some studies have found little difference between timings (Terman et al. 1993, Terman and Terman 2002), and the apparent advantage of morning light may be partly explained by an anomalous order effect in cross-over designs (Tuunainen et al. 2002). When morning light is effective, it might work by suppressing or phase-advancing an overly-late melatonin offset (Wehr et al. 2001). It seems possible (though unproven) that conditions in which mood complaints are most prominent might have a common etiology in circadian phase malsynchronization which is characterized by abnormal entrainment of circadian rhythms to the solar day and/or abnormal relationships among rhythms in the body.

The work of Neumeister et al. (1996), Bloching (2000) and Loving (2005) suggested that partial sleep deprivation combined with bright light produces transient antidepressant responses, as demonstrated by significant contrasts between bright light and placebo.

In this paper, we report on a clinical trial of bright

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light treatment. The trial sought to demonstrate greater improvements in mood and sleep among volunteers receiving 1 week bright light as contrasted to placebo.

Case Report

Recruitment of two volunteer in-patients was from March 2010 to June 2010. Informed consent was obtained from each participant and his parents repectively prior to the start of the study, in accordance with the guidelines set forth by the Declaration of Helsinki. Patients were encouraged to continue ongoing treatment (both received Psychotherapy and 40mg Fluoexetine daily) during the study, with the assumption that psychotherapy and medication effects over an interval of 6 weeks were likely to be small, since there was no change of medication/dosage and psychotherapy (2 sessions/week) since 6 weeks before the 5 week study period.

Two male caucasian volunteers, ages 14 and 17 years, with mild depressive disorder according to the DSM-IV criteria were evaluated for the clinical trial. Any lifetime history of mania required exclusion of the potential volunteer, as a history of mania appears to predict a greatly increased risk of a manic switch during bright light treatment (Kripke 1991). Patients were encouraged to sleep from 22:00 to 07:00 during the study period.

Step 1: Volunteers began with the initial baseline week of the study. The purposes of the baseline week of the study was to be able to differentiate changes of the Beck Depression Inventory (BDI) (Beck et al. 1961) score related to depression to that of placebo and BLT treatment.

Step 2: In the second week of the study, the volunteers were asked to sit alone in front of the placebo light box for (white light, 50 lux) 60 minutes in the morning, from 09:00 to 10:00 a.m, In this time, patients played or listened to a story. As reviewed by Eastman [1990], the issue of placebo responses has been a serious problem in clinical bright light studies, though the placebo problem has been negligible in studies of the physiologic effects of light.

Step 3: In the third week of the study, patients were asked to sit alone in front of the bright light box (2500 lux) from 09:00 to 10:00 a.m, i.e. for only one hour, because dosages of drugs and hence also BLT time should be reduced in children, adolescents, and older adults.

Step 4: In the fourth week of the study, patients received neither placebo nor Bright Light Therapy. The purposes of this week of the study was again to be able to differentiate changes of the BDI score related to depression to that of placebo and Bright Light treatment.

Depressive symptoms were assessed weekly by the Beck Depression Inventory (BDI). This test consists of 21 items, asking for symptoms like sadness, suicidality, agitation and sleeping disorders, scoring from 0=not existent to 3=always existing. A cut-off of 9, i.e. that scores of >9 are typical for depressive disorders.

Saliva samples were collected 1 week before and one day before placebo treatment, on the day between placebo and verum treatment,on the day after verum treatment and one week after verum treatment, at each time at 08:00 a.m. and 08:00 p.m., and assayed for melatonin to characterize the circadian phase of the subject's melatonin rhythms.

The subjects completed a weekly Scale for Assessment for systematic Treatment Emergent Events (SAFTEE) (Moynihan 1983). This physical symptom inventory consists of 20 items (range: severe-moderate-mild-minimal-not existing) and examines adverse reactions. Four weeks of treatment were carried out with weekly symptom assessments.

Subjects' moods improved under both treatments. BDI scores did not change significantly in the pre-treatment period (from 13 to 14 and from 13 to 12 respectively), improved during treatment with placebo (10 and 8 respectively) and again during treatment with bright light therapy (both patients scored 3) In the post-treatment period, the score rose again to 7 and 9 respectively.

Morning salivary melatonin (5.1 pg/ml) was significantly lower than in healthy controls (normal range < 5pg/ml). It decreased in the placebo- (3 pg/ml) and again in the BLT (1 pg/ml) period and rose again in the post-treatment period (4.9 pg/ml). Salivary melatonin, measured in the evening (8.2 pg/ml) was also lower than in healthy controls (normal range >10 pg/ml), increased after placebo to 20.4 pg/ml and again after BLT to 32.1 pg/ml, and decreased in the post-treatment week again to 14.8 pg/ml.

With respect to the SAFTEE, the subscale "Depression" was scored exclusively by means of the BDI. The symptom Headache improved with bright light in one patient from mild to minimal, and with dim light, nausea and vomiting improved in the other patient also from mild to minimal. This improvement lasted until the end of the study. With respect to the other symptoms, patient did not report any change, i.e. they were always scored as "minimal" or "not existing", without any changes in the four weeks.

Discussion

Altogehter, White bright light treatment (2500 lux) was slightly superior to white dim placebo light (50 lux). The beneficial effects found in the study might be attributed to several factors that were common to the treatment and control groups. The "placebo" effect, chiefly positive expectations, positive staff contacts, and spontaneous remission may have contributed to positive responses. In addition, the social structure and regularized sleep might be beneficial. An hour a day engaging in a treatment, thought to be helpful, may have induced a reduction in depressive symptoms. Likewise, the effects of bright light treatment on melatonin phase were modest. A longer period may be needed for this population with depressive symptoms. The antidepressant response to placebo light treatment in this study was similar to that reported for placebo in drug studies (Khan et al. 2000). However, placebo

response is significant and needs to be considered as a confound variable in antidepressant light treatment studies.

Rhythms of melatonin, sleep, and activity all peak later in depressed patients as compared to healthy controls. However, since increased light exposure is generally associated with more advanced rhythms, the delayed circadian rhythm of our patients improved during Bright Light therapy as cotrasted to placebo.

Conclusion

Bright light therapy seems to have an augmenting effect for antidepressive therapies in adolescents. Furthermore, the results suggest that Bright Light Therapy may also improve the circadian rhythm.

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