

A rare case modafinil dependence

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ABSTRACT

Modafinil, a non-amphetamine psychostimulant, is indicated for narcolepsy, shift work sleep disorder and severe obstructive sleep apnea syndrome. Modafinil is prescribed at the dose of 100 mg once in a day or as two doses, 12 h apart in a day. It has also been found that it reduces cocaine dependence and withdrawal phenomenon. Modafinil is claimed to have very low liability for abuse and dependence. Here we report a rare case of modafinil dependence.

Key words: Drug dependence, modafinil, psychostimulant

CASE REPORT

A 44 year old single male, presented to our outpatient department with complaints of day time excessive sleepiness, lethargy, low mood and disturbed sleep at night for the past 3 months. History revealed that these symptoms were triggered by the death of his father. On detailed evaluation, it was found that he had been on treatment for his mental illness from 2005. The course of illness was continuous characterized by withdrawn behavior, preoccupation, fear, auditory hallucinations, referential delusions and decline in social and occupational functioning. He was evaluated by a psychiatrist and started on psychotropics. During follow-up, the patient complained of episodes of depressed mood, anxiety and sleep disturbance, lethargy and sleepiness that affected his shift work, for which he was prescribed modafinil 200 mg, along

with the antipsychotics Risperidone 4 mg and Amisulpride 400 mg. The patient himself gradually increased the dose to overcome the drowsiness that interrupted his shift work. He started with 100 mg every 3-4 h over a shift work of 12 h. For the last 6 months he was unable to overcome his sleepiness during work without modafinil 100 mg/h thus making a total of 1200 mg/day of modafinil which he used to obtain over the counter. He claimed to have symptoms of worsening of lethargy, tremors of hands, anxiety and erratic sleep hours when he skipped modafinil, patient reported a sense of well-being only with the drug and with the above dose.

There was no family history of mental illness. Physical examination was within normal limits except for fine tremors. His blood investigations gave the following values hemoglobin – 12.4 gm%;, WBC count – 6300 cells/mm³; platelet count – 2.4 lakhs/mm³;, random blood sugar – 122 mg/dl. His metabolic parameters including renal function, liver function, lipid profile were within normal limits. Electrocardiogram showed sinus rhythm and echocardiogram showed normal left ventricular function.

The provisional diagnosis made was schizoaffective disorder currently in partial remission. An additional diagnosis of modafinil dependence syndrome (dependence criteria as

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per DSM V) was made in view of the tolerance, withdrawal, inability to cut down, progressive increase in the amount of drug over a longer period of time and craving.

The dose was tapered slowly over a period of 1 month with 100 mg every 2-3 days and started on bupropion. He reported sleep disturbance, increased sense of body warmth, lethargy and low mood during the process of tapering the drug. Low dose of clonazepam was added to reduce the withdrawal symptoms. Patient reported significant improvement in his sleep pattern. His dysphoric mood and lethargy improved and his level of anhedonia and amotivation decreased.

DISCUSSION

In literature, only one case study has been reported on modafinil dependence at higher doses. In our case report, the patient reported himself started consuming more tablets to increase the effects derived from modafinil and landed with dependence phenomenon.^[1]

Unlike amphetamine and its derivatives, Modafinil is said to act by mechanisms independent of dopaminergic system which is involved in dependence phenomenon of sympathomimetics and opioids and hence is devoid of addiction potential. However there are few recent studies reporting that modafinil also binds to dopamine receptors and also affects dopamine uptake by dopamine transporters in the neurons. Increasing doses of modafinil was found to be a potent reinforcer. Another study conducted to know about modafinil's subjective and behavioral effects showed that modafinil increases rating scale of the Addiction Research Center Inventory (ARCI) as much as amphetamine. Modafinil dependence can be attributed to its dopamine uptake blockade thereby increasing its concentration in dopaminergic areas of brain.^[2,3] There is also a case of modafinil associated psychosis and reports of withdrawal phenomenon.^[4] Overdose of modafinil is not safe; as a central nervous system stimulant it is prone to cause insomnia, agitation, tachycardia, rise in blood pressure etc.^[5-7] There are no controlled trials or reports available for the treatment of Modafinil addiction. In this patient,

we cross-tapered modafinil with bupropion because of its action on dopamine and norepinephrine reuptake inhibitor, thus producing an effect similar to that of modafinil with antidepressant activity.

Modafinil is listed as a schedule IV drug in the United States for its restricted sale. However in our country modafinil is available over the counter. There is no regulation on Modafinil sale which has to be revised to prevent its abuse. It is widely purchased over the counter by night shift workers to increase work the efficiency without sleep. Though abuse potential is claimed to be less, it should be considered serious due to increased use of modafinil among youngsters.

CONCLUSION

Our case report is one among the very few reports of modafinil dependence, it gives a call for the need of regulations on the sale of modafinil.

REFERENCES

1. Kate N, Grover S, Ghormode D. Dependence on supratherapeutic doses of modafinil. A case report. *Prim Care Companion CNS Disord* 2012;14. pii: PCC.11101333.
2. Myrick H, Malcolm R, Taylor B, La Rowe S. Modafinil: Preclinical, clinical, and post-marketing surveillance—A review of abuse liability issues. *Ann Clin Psychiatry* 2004;16:101-9.
3. Volkow ND, Fowler JS, Logan J, Alexoff D, Zhu W, Telang F, *et al.* Effects of modafinil on dopamine and dopamine transporters in the male human brain: Clinical implications. *JAMA* 2009;301:1148-54.
4. Marianni J, Hart CL. Psychosis associated with modafinil and shift work. *Am J Psychiatry* 2005;162:1983.
5. Lackey GD, Alsop JA, Albertson TE. A 24 month retrospective study of adult modafinil ingestions. *Clin Toxicol (Phila)* 2007; 45:641.
6. Carstairs SD, Urquhart A, Hoffman J, Clark RF, Cantrell FL. A retrospective review of supratherapeutic modafinil exposures. *J Med Toxicol* 2010;6:307-10.
7. Spiller HA, Borys D, Griffith JR, Klein-Schwartz W, Aleguas A, Sollee D. Toxicity from modafinil ingestion. *Clin Toxicol (Phila)* 2009;47:153-6.

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