Key Words: psychotropic drugs, weight loss, carbohydrate craving, obesity, antidepressants, weight gain, antipsychotic drugs

The Effect of a Novel Dietary Intervention on Weight Loss in Psychotropic Drug-Induced Obesity

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ABSTRACT ~ Weight gain associated with the use of psychotropic drugs may be related to their blockade of serotonin receptors which mediate satiety. Obese individuals whose weight gain followed psychotropic drug use, or control nondrug-treated obese subjects, were treated with a 12-week weight loss program that included a carbohydrate-rich, protein-poor beverage thought to increase brain serotonin. The 38 psychotropic drug treated females lost slightly more weight than their 60 nondrug-treated controls, ie, 13.4±1.8 pounds versus 12.1±1.1 pounds. The eight drug-treated males lost 26±4.1 pounds and their 12 nondrug-treated controls lost 22.2±3.2 pounds. Weight loss was significant in all groups (all P<.001). A treatment program that included a high carbohydrate dietary supplement caused as much weight loss among patients on psychotropic drugs as among control obese patients, without blocking the drugs' therapeutic effects.
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Introduction

Patients chronically treated with psychotropic medications including atypical antipsychotic agents and the selective serotonin reuptake inhibitors (SSRIs) may gain substantial amounts of weight,[1-6] at least partly because they overconsume sweet and starchy foods.[3,6] This change in eating behavior may result from blockade by the drugs[7-10] of the serotonergic 5-HT_{2C} receptors that regulate protein and carbohydrate intake, and mediate satiety.[11,12] Since these same receptors are involved in the drugs' therapeutic effects, use of the drugs is not infrequently linked to the unfortunate consequence of destabilizing weight. Reversing the resulting weight gain by the use of anorectic agents that activate these receptors

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might not be advisable, since such agents could interfere with the therapeutic effects of the psychotropic drugs.

We conducted a study to see whether increasing brain serotonin production through the twice daily consumption of a carbohydrate-rich, protein-poor beverage could reverse the obesity caused by the psychotropic drugs without diminishing their therapeutic effects. Weight loss was compared with that in a similarly treated population whose obesity was not related to psychotropic drug use.

Methods

The study was conducted at the TRIAD Weight Management Center at McLean Hospital in Belmont, Massachusetts. Patients came from the greater Boston area. The 12-week weight loss program provided six nutritional education and counseling sessions, and six individualized exercise sessions. The 1,800-calorie food plan for men and 1,400 calorie plan for women included three meals and two carbohydrate-rich, protein-poor supplements. The supplement contained 45 grams of food-derived, high-glycemic-index carbohydrates, and was consumed an hour before lunch and dinner. The drink contained sufficient carbohydrate to elevate the ratio of the plasma tryptophan concentration to the summed concentrations of five other large neutral amino acids (the "plasma tryptophan ratio") within 30 minutes of its consumption,[13] thus leading to increased brain serotonin synthesis.[11,14]

Weight change over the 12-week period was analyzed for subjects who were concurrently receiving psychotropic drugs, and for those who were medication free. (As the clinic population consisted of individuals who were paying for their weight-loss treatment, it was not possible to have a control sample that was not also receiving a nutritional intervention to elevate brain serotonin). A paired *t*-test was used to compare initial and week 12 body mass indices and weight.

Results

The subject population included 38 females and 8 males who had been treated with psychotropic drugs for at least 1 year and were still receiving those drugs. The control sample consisted of 60 females and 13 males who enrolled in the weight loss center over the same period of time. The mean ages and body mass indexes of the two groups did not differ significantly. (Table 1).

The female patients on psychotropic drugs and the control females lost similar amounts of weight. Females with drug induced obesity lost an average of 13.4±1.1 pounds and control females lost 12.1±1.1

pounds (Tables 2 and 3). Males with drug–induced obesity lost an average of 26±4.1 pounds; control males lost 22.2±3.2 pounds.

Twenty-four females and six males were being treated with a single antidepressant; the others were on combinations of antidepressants and/or other psychotropic drugs (Tables 4 and 5). No relationship was observed between type of drug treatment and weight loss. Five females who were on psychotropic drugs known to cause substantial weight gain (lithium, thioridazine, molindone, risperidone, valproate, quetiapine) lost between 22 and 37 pounds in 3 months; five of the eight male patients on antidepressant drugs associated with weight gain lost 30 or more pounds.

None of the drug-treated patients reported a decrease in the efficacy of their medications temporally associated with consuming the carbohydrate-rich supplement.

TABLE 1

PROFILE OF PATIENTS WITH DRUG-INDUCED OBESITY

DRUG-INDUCED OBESITY	FEMALES	MALES
Number	38	8
Mean age (years)	46	41
Age range(years)	21–72	28–49
Weight at baseline (pounds)	212.5±6.2	300.7±27
Body mass index at baseline	35.1±0.9	40.6±2.9

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TABLE 2

PROFILE OF PATIENTS WITH NONDRUG-INDUCED OBESITY

NONDRUG-INDUCED OBESITY	FEMALES	MALES
Number	60	13
Mean age (years)	47	47
Age range (years)	16-75	35–65
Weight at baseline (pounds)	212.6±5.2	264±25
Body mass index at baseline	35.9±0.8	41.1±3.9

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TABLE 3

MEAN 12-WEEK WEIGHT LOSS

STUDY GROUP	FEMALES	MALES
Drug-induced obesity (pounds)	13.4±1.8	25.8±4.1
Controls (pounds)	12.1±1.1	22.2±3.2

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TABLE 4

THREE-MONTH WEIGHT LOSS OF FEMALE PATIENTS ON PSYCHOTROPIC MEDICATION

DRUG	WEIGHT CHANGE (POUNDS)
Fluoxetine	X=10.5(range+3.75 to −22.5) (n=9)
Fluoxetine /alprazolam*	32
Fluoxetine/clonazepam	13.5 (n=2)
Venlafaxine	4
Venlafaxine/sertraline	15.3
Venlafaxine/trazodone	6.5
Venlafaxine/risperidone	33
Sertraline	7.6 (n=2)
Sertraline/quetiapine/lorazapam	10
Paroxetine	X=17.9 (range −6 to − 31.2) (n=3)
Paroxetine/nortriptyline	16.7
Citalopram	6.9 (n=2)
Bupropion	6.9
Imipramine	22.2
Nefazodone	17.7
Nortriptyline	7
Lithium	26.5
Lithium, nefazodone, lorazepam	1.2
Lithium, thioridazine, molindone	36.7
Trazodone/lorazepam	16.8
Valproate/olanzapine	0.8
Valproate/risperidone	22.5
Quetiapine/clonazepam/bupropion	33.8
Lithium, risperidone, valproate, oxazepam, nortriptyline	7

*Represents >1 patient.
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TABLE 5

THREE-MONTH WEIGHT LOSS AMONG EIGHT MALE PATIENTS ON PSYCHOTROPIC MEDICATIONS

DRUG	WEIGHT CHANGE (POUNDS)
Citalopram*	39.2
Citalopram	34.7
Fluoxetine	16.2
Fluoxetine	33.2
Amitriptyline	31.5
Paroxetine	14.5
Nefazodone, bupropion	30
Valproate/risperidone	7

*Represents >1 patient.
Wurtman JJ, McDermott JM, Levendusky P, Duca K, Wurtman R. *Psychopharmacology Bulletin*. Vol. 36. No. 3. 2002.

CONCLUSION

These data show that obese individuals whose weight gain is associated with psychotropic drug treatment are able to lose substantial amounts of weight with a treatment that increases serotonin synthesis. Their weight loss is as good as that of obese individuals whose weight gain was not associated with ongoing psychotropic drug treatment. ✤

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