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SERUM LEPTIN LEVELS AND SERUM CHOLESTEROL LEVELS IN PATIENTS ON WEIGHT NEUTRAL ANTI DEPRESSANTS

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ABSTRACT

Background: Weight gain is a well-known side effect of almost all anti-depressants. With weight gain there are changes in Leptin levels and changes in the levels of LDL cholesterol, HDL cholesterol and total cholesterol. IN this study, we tried to compare the changes in these parameters in regular anti-depressants and in weight neutral anti-depressants. **Methods:** In this study, we took a total of 143 patients. Out of these patients, 95 patients were on regular anti-depressants and 48 patients were on weight neutral antidepressants. We measured serum Leptin levels at the beginning of the study and then 6 months after the patients were on the medications. All the patients were fully compliant with their medications. **Results:** In our study, we found that the serum Leptin level was 57.5±6.4 in group A and 58.1±5.3 in group B. After 6 months, it was 49.6±5.4 and 52.4±4.3 respectively. Total cholesterol level increased to 208.7±27.12 from 201.8±30.41 and in group B it increased from 197.2±96 to 232.8±22.95. On applying student's t test, p value was found to be 0.001 which is statistically significant. HDL levels and LDL levels also showed statistically significance in group A and group B. **Conclusion:** There was an increase in serum Leptin levels and increase in dyslipidaemia in patients on regular anti-depressants as compared to weight neutral anti-depressants.

INTRODUCTION

The major concern regarding the use of anti-depressants is weight gain. Many patients become non-compliant to the medications due to weight gain. Majority of the anti-depressants available in the market have this side effect. Leptin plays a major role in weight regulation.[1] In this study, we tried to see the level of leptin in weight neutral anti-depressants.[2-3] Leptin is produced by adipocytes. Leptin receptors are located in the satiety centre of hypothalamus. By this, leptin regulates appetite and body weight. Exogenous leptin administration results in nutrition intake reduction and reduction in body weight. Many studies have showed an inverse co-relation between serum leptin levels and body mass index and body fat ratio. Further studies have also proved a co-relation between TNF-alpha and body weight. TNF-alpha levels are higher in obese patients as compared to lean patients. Hypercholesterolemia, high triglycerides and high LDL and low HDL levels are responsible for causing atherosclerotic plaques and in turn myocardial infarction.[4,5]

Many studies have been done comparing weight and BMI in regular anti-depressants and weight neutral anti-depressants but not many studies have shed light on serum leptin levels in these two groups. In this study, we tried to compare the levels of serum leptin in regular anti-depressants and weight-neutral anti-depressants.

METHODS

This is a longitudinal study with a sample size of 143 patients who came to Civil hospital, Ahmedabad. Inclusion criteria are age >20 years, mild to moderate depression according to HAMILTON -DEPRESSION rating scale. Patients with other psychiatric disorders like bipolar disorder, Schizophrenia, OCD etc were

excluded from the study. Patients with cardiovascular, renal and haematological disorders were also removed from the study. A total of 143 patients were included in the study. OF these 143 patients, 95 patients were on regular anti-depressants and 48 patients were on weight neutral anti-depressants. Most of the SSRIs and TCAs cause weight gain. For weight neutral anti-psychotics, we included the patients on Duloxetine, Bupropion, Venlafaxine and Desvenlafaxine. All the patients were explained about the research project and compliance guidance. Serum Leptin levels were measured in the patients at the start of the medications. After 6 months, Serum Leptin levels were re-checked. The values are depicted in the tables. Student t-test was done and the p-value was calculated. The p-value was calculated to be 0.001. It is <0.05 which shows that the difference is statistically significant.

RESULTS

The baseline characteristics of all the participants are given in the table 1. At the time of initiation of the treatment, the average weight of participants in the weight neutral anti-depressants was 70±5.7 kg and after 6 months of treatment, it was 71±6.8kg. At the time of initiation of the treatment, the average weight of participants in the anti-depressants with weight gain was 68±4.2kg and after 6 months of treatment, it was 78±6.6kg. At the time of initiation of the treatment, the average BMI of participants in the weight neutral anti-depressants was 25 ±3.1 and after 6 months of treatment, it was 24.8 ±4.1. At the time of initiation of the treatment, the average BMI of participants in the weight gain anti-depressants was 26.1 ±2.3 and after 6 months of treatment, it was 29.3 ±4.8.

Serum leptin levels and cholesterol levels are depicted in the table 2. Mean leptin level was 57.5±6.4 ng/ml in patients on weight neutral anti-depressants at the time of the initiation of the treatment and after 6 months, it was 49.6±5.4 ng/ml. In patients on anti-depressants with weight gain, the leptin level was 58.1±5.3 ng/ml and 52.4±4.3 ng/ml respectively at the time of initiation of the treatment and after 6 months. Total cholesterol was 201.8±30.41 mg/ml at the initiation of the treatment and 208.7±27.12mg/ml after 6 months of treatment in patients on weight neutral anti-depressants. Total cholesterol was 197.2±96 mg/ml at the initiation of the treatment and 232.8±22.95 mg/ml after 6 months of treatment in patients on weight gain anti-depressants. HDL level was 40.1±5.7 mg/ml at the initiation of the treatment and 41.2±6.8 mg/ml after 6 months of treatment in patients on weight neutral anti-depressants. HDL level was 41.1±4.7 mg/ml at the initiation of the treatment and 36.47±5.7 mg/ml after 6 months of treatment in patients on weight gain anti-depressants. LDL level was 98.4±4.7 mg/ml at the initiation of the treatment and 102.4±5.6 mg/ml after 6 months of treatment in patients on weight neutral anti-depressants. LDL level was 100.4±5.7 mg/ml at the initiation of the treatment and 122.4±6.7 mg/ml after 6 months of treatment in patients on weight neutral anti-depressants.

Triglyceride level was 147.45±6.8mg/ml at the initiation of the treatment and 149.5±7.1mg/ml after 6 months of treatment in patients on weight neutral anti-depressants. Triglyceride level was 149.5±7.1mg/ml at the initiation of the treatment and 170.4±5.2mg/ml after 6 months of treatment in patients on weight neutral anti-depressants.

Table 1: Baseline characteristics of the patients at the beginning of the study.

	Patients on weight neutral anti-depressants	After 6 months- Patients on weight neutral anti-depressants	Patients on anti-depressants with weight gain	After 6 months- Patients on anti-depressants with weight gain
Weight (kg)	70±5.7	71±6.8	68±4.2	78±6.6
Height (cm)	167 ±10.4	167 ±10.4	169 ±11.3	169 ±11.3
BMI (kg/m2)	25 ±3.1	24.8 ±4.1	26.1 ±2.3	29.3 ±4.8

Table 2: Serum Leptin levels and Cholesterol levels in patients on weight neutral anti-depressants and weight gain anti-depressants.

	On weight neutral anti-depressants	After 6 months	On anti-depressants with weight gain	After 6 months	P value
Mean Leptin level (ng/ml)	57.5±6.4	49.6±5.4	58.1±5.3	52.4±4.3	0.001
Total cholesterol(mg/ml)	201.8±30.41	208.7±27.12	197.2±96	232.8±22.95	0.001
HDL level(mg/ml)	40.1±5.7	41.2±6.8	41.1±4.7	36.47±5.7	0.001
LDL level(mg/ml)	98.4±4.7	102.4±5.6	100.4±5.7	122.4±6.7	0.001
Triglyceride(mg/ml)	147.45±6.8	149.5±7.1	149.5±7.1	170.4±5.2	0.001

DISCUSSION

As a general rule, during the treatment of various diseases, increase in body weight is considered as a good prognostic sign. But in many diseases, when the weight gain is drug induced, the excessive weight gain may result in decrease in compliance in the patients. The drugs causing weight gain are anti-psychotics, anti-depressants and drugs for bipolar disorder. Weight gain by drugs is due to reduction in physical exercise due to sedation. It is also presumed to be due to stimulation of

appetite. Obesity is related to disorders in glucose, insulin and lipid metabolism. Adipose tissue also secretes various substances like Leptin, Tumour Necrosis Factor alpha. These are involved in weight regulation.

Obesity is related to alteration in lipid levels and alteration in lipoprotein levels. This in turn leads to increase in risk of cardiovascular events. Physical activity offers several benefits apart from weight loss. Many studies have showed that physical activity improves mood and increases self-confidence. Physical activity alone without any dietary changes has no effect on weight loss.[6,7] In our study, out of total 143 patients, 92 patients were males and 51 patients were females. All the patients in the study were in the age group of 20-40 years.

As per the latest report of WHO in 2018, it showed that India has maximum number of depression cases The prevalence rate of depression in India is 1.5/1000 to 37.74/1000.[8] The maximum risk of development of depression is in women of child bearing age. Causes like victimization, sex-specific socialization, internalization, coping style, disadvantaged social status and most important is stigma associated with mental illness is considered to result in increase in cases of depression in women as compared to men.

Many studies have also showed that obesity is associated with increase in risk of depression. BMI >30 is considered a risk factor for development for depression. There is a bidirectional association of obesity with depression. Depressed individuals are more prone to develop weight gain due to poor food choices and reduced physical activity. Many psychological stresses lead to increase in food intake and increase in unhealthy food choices as a coping mechanism. Among anti-depressants TCAs, MAOIs, SSRIs are known to have more problems of weight gain.

Serum Leptin levels are higher in females as compared to males. This is due to inhibition by androgens and stimulation by oestrogen. The activation of TNF-alpha is an early and sensitive marker of weight gain by anti-depressants. A study by Max Plank showed that weight gain by anti-depressants can occur even without increase in levels of Leptin.

Limitations of this study are the small sample size of the participants. Secondly, it is hard to predict and compare the life style and physical activities of the participants in the study.

CONCLUSION

There was an increase in serum Leptin levels and increase in dyslipidaemia in patients on regular anti-depressants as compared to weight neutral anti-depressants.

REFERENCES

1. Hinze-Selch D, Schuld A, Kraus T, Kühn M, Uhr M, Haack M, et al. Effects of antidepressants on weight and on the plasma levels of leptin, TNF-α and soluble TNF receptors: a longitudinal study in patients treated with amitriptyline or paroxetine. Neuropsychopharmacol, 2000; 23(1): 13-9.
2. Auwerx J, Staels B. Leptin. Lancet, 1998; 351: 737-74.
3. Argiles JM, López-Soriano J, Busquets S, Lopez-Soriano FJ. Journey from cachexia to obesity by TNF. The FASEB journal, 1997; 11(10): 743-51.
4. Mutlu-Turkoglu U, Oztezcan S, Orhan Y, Aykac-Toker G, Sivas A, Uysal M. An increase in lipoprotein oxidation and endogenous lipid peroxides in serum of obese women. Clin Exp Med, 2003; 2: 171-4.
5. Myara I, Alamowitch C, Michel O, Heudes D, Bariety C, Guy-Grand B, et al. Lipoprotein oxidation and plasma vitamin E in nondiabetic normotensive obese patients. Obes Res., 2003; 11: 112-20.
6. Pi-Sunyer X. A clinical view of the obesity problem. Science, 2003; 299(5608): 859-60.
7. Bell EA, Rolls BJ. Regulation of energy intake: factors contributing to obesity. Present Knowledge in Nutrition, 2001; 31-42.
8. Nandi DN, Ajmany S, Ganguly H, Banerjee G, Boral GC, Ghosh A, et al. Psychiatric disorders in a rural community in West Bengal: an epidemiological study. Ind J Psy, 1975; 17: 87-99.