RESEARCH ARTICLE

Comparison of Serum Lipid Profile Changes during Treatment of Olanzapine and Risperidone

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ABSTRACT- Background: Several studies demonstrated relationship between dyslipidemia and various antipsychotic drugs after treatment of psychotic disorders. Our study aimed to compare the effects of commonly prescribed antipsychotic drugs Risperidone and Olanzapine on serum lipid profile of psychiatric patients.

Methods: This current study was conducted on 30 psychiatric patients, divided into two groups according to the antipsychotic drug prescribed by doctor Risperidone or Olanzapine. All the patients were assessed for changes in serum lipid profile Total cholesterol (TC), Triglycerides (TG), High Density Lipoprotein (HDL-C), Low Density Lipoprotein (LDL-C), Very Low Density Lipoprotein (VLDL-C) & Risk Factors for coronary artery disease (CAD Risk Factor I &II) after 16 weeks of treatment.

Results: Patients taking Olanzapine therapy were showed significant ($p<0.05$) increase in all lipid parameters, whereas Risperidone treated patients has shown a significant increase in serum triglyceride and VLDL-C only.

Conclusion: Olanzapine therapy is strongly associated with dyslipidemia than Risperidone.

Key-words- Dyslipidemia, Lipid profile, Coronary artery disease, Risk factors, Schizophrenia

INTRODUCTION

The numerous scientific studies have been conducted on patients of schizophrenia to determine whether antipsychotic drugs are associated with lipid derangement. [1] Schizophrenic patients who receive antipsychotic drugs may be highly prone to metabolic disorders such as weight gain, dyslipidemia, and insulin resistance. Schizophrenic patients have a reduced life expectancy of as many as 9-12 years less than the general population, mainly due to factors such as an increased rate of suicide and illness, as well as an increased prevalence of type 2 diabetes and cardiovascular disease. [2,3]

They are naturally at increased risk for dyslipidemia and obesity and this condition can be exacerbated by some antipsychotic medication like clozapine and olanzapine. [4,5] Some studies have found decreased life expectancy associated with the use of antipsychotics and argued that more studies are needed to strengthen this view point.

The data generated from studies of schizophrenia patients exposed to conventional antipsychotics illustrate that agents with similar modes of therapeutic action may have significantly different metabolic profiles. Several studies emerged examining the metabolic profiles of this class of antipsychotics. In general, these antipsychotic drugs were found to elevate serum triglycerides (TG) and total cholesterol (TC), but with greater effects on TG concentrations. Subsequent studies confirmed the finding that high serum TG seemed to be the primary significant dyslipidemia, but elevated TC could also be found.[6]

Novel atypical antipsychotics used for the treatment of schizophrenia offer significant advantages over conventional compounds, particularly because they are associated with fewer extrapyramidal symptoms than conventional antipsychotics.[7]

However, atypical antipsychotic agents have their own drawbacks, as they may be associated with a worsening of cardiovascular risk factors such as weight gain, hyperglycemia and hyperlipidaemia.

The aim of the current study was to intend briefly highlights the research approach to understand the association between dyslipidemia and to compare the effects of antipsychotic agents during treatment of schizophrenia.

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MATERIALS AND METHODS

This present study was conducted to assess the comparison of serum lipid profile alteration after treatment with Olanzapine and Risperidone after 16 weeks of treatment. Total thirty patients, who completed 16 weeks of treatment with prescribed drug (Olanzapine or Risperidone) were included in this study from OPD of the dept. of Psychiatry, People's Hospital and Hamidia Hospital, Bhopal MP, India.

These 30 psychiatric patients were divided into 'Two sub groups' according to the antipsychotic drug being administered.

I. Olanzapine Group: This group comprised of 19 patients (21 Males, and 9 Females), median age 31 years.

Prescribed oral dose: 5 to 10 mg daily for 16 weeks.

II. Risperidone Group: This group comprised of 11 patients (18 Males, and 12 Females), median age 30.2 years.

Prescribed oral dose: 2 to 4 mg daily for 16 weeks.

For all participant patients requisition forms were filled including their age, sex, psychiatric diagnosis, other non-psychiatric medical complaints and smoking habit. Informed consent was taken from all participants. Fasting blood samples collected from all patients and stand for clot and serum specimens were tested for following biochemical parameters: 1. Total cholesterol (TC), 2. Triglycerides (TG), 3. High Density Lipoprotein (HDL-C), 4. Low Density Lipoprotein (LDL-C), 5. Very Low Density Lipoprotein (VLDL-C), 6. Risk Factors for coronary artery disease (CAD Risk Factor I & II).

Above biochemical parameters were determined on before treatment and then after 12 weeks and 16 weeks of specific medication. Biochemical analysis of all the serum samples was done on BioSystems A 25 fully automated analyzer using Biochemistry kits.

Quantitative variables were expressed as mean and SD. The groups were compared to the mean scores of clinical variables using analysis of variance. Student's t-test was used for group comparison and $P < 0.05$ was considered as statistically significant.

RESULTS

Out of the 30 newly diagnosed schizophrenic patients, 11 patients were given Olanzapine and another 19 were given Risperidone. The diagnosis and antipsychotic medications of both the groups was decided by the psychiatrist. Table 1 shown the number of cases receiving Olanzapine and Risperidone and their age-sex wise distribution in different age-group. Out of the 30 Schizophrenic patients, 73% (n= 22) were males with the majority (45.7%) in the age range 25–49 years while 27% were female in the same age group (62.5%). The mean age of subjects in Olanzapine group was 31.26±10.5 years, 30.4±11.30 years for Risperidone group. There was no significant difference in age between two groups.

Table 1: Sociodemographic age factor data of the subjects

Age-group (Years)	Olanzapine-Group (n= 19)		Risperidone-Group (n= 11)	
Sex	**Male**	**Female**	**Male**	**Female**
10-24	2	1	2	1
25-49	5	2	7	3
50-75	1	0	5	1

The comparison of various Lipid profile parameters between Olanzapine and Risperidone is shown in Table 2. These results indicateD that all the lipid parameters differed statistically significantly ($P<0.05$) in Olanzapine group, while in case of Risperidone group only TG & VLDL-C is raised significantly. Total cholesterol, HDL-C, and LDL-C level differed non-significant after taking Risperidone up to 16 weeks. Assessment of Risk factors (CHO/HDL & LDL/HDL) shown significant raised only in case of Olanzapine treated patients.

Table 2: Comparative effects of Antipsychotic drugs on lipid profile level of schizophrenic subjects

Lipid parameters	Antipsychotic used	Before treatment Mean±SD	After 12 weeks of treatment Mean±SD	After 16 weeks of treatment Mean±SD	p-value
S.CHO	Olanzapine	176.36±37.69	192.20±39.03	202.10±41.60	<0.05
	Resperidone	170.16±32.2	176.10±34.01	178.93±33.04	>0.05
TG	Olanzapine	143.00±48.30	172.66±51.27	181.50±50.90	<0.05
	Resperidone	130.93±45.40	153.90±46.20	158.40±45.81	<0.05

HDL-C	Olanzapine	36.33±5.50	33.66±4.76	32.56±4.22	<0.05
	Resperidone	37.20±5.80	35.86±5.88	34.9±5.38	>0.05
LDL-C	Olanzapine	111.43±30.96	124.06±32.82	133.23±37.60	<0.05
	Resperidone	106.78±25.62	109.44±27.68	112.35±27.50	>0.05
VLDL-C	Olanzapine	28.60±9.66	34.53±10.25	36.33±10.19	<0.05
	Resperidone	26.18±9.00	30.78±9.24	31.68±9.16	<0.05
R1	Olanzapine	4.87±0.87	5.74±1.03	6.22±1.10	<0.05
	Resperidone	4.63±0.86	4.99±1.04	5.20±1.06	>0.05
R2	Olanzapine	3.07±0.74	3.69±0.88	4.09±1.05	<0.05
	Resperidone	2.91±0.69	3.10±0.83	3.27±0.88	>0.05

p< 0.05= significant, S.D = Standard deviation

DISCUSSION

This study has shown that the prevalence of Schizophrenia is highest in age group 25–49 years for both male and females. In our study the effects of antipsychotic drugs on serum lipid profile were measured after 12 weeks and 16 weeks of treatment with either Olanzapine or Risperidone. In a population-based case-control study, the chance of developing hyperlipidaemia was five times higher in schizophrenic patients taking Olanzapine, three times higher in those taking typical antipsychotics, and no higher in those taking Risperidone. The exact mechanism responsible for the causation of dyslipidemia is not clear. However, it may be due to several complex neurotransmitter and metabolic interactions.[8]

The comparative result of Lipid profile level between Olanzapine and Risperidone group shown that mean total cholesterol level was raised to 14.5% in the Olanzapine group and only 4.7% in Risperidone group after 16 weeks of treatment. This indicatd that mean cholesterol level differed statistically significantly (p<0.05) in Olanzapine group and non-significantly (p>0.05) in Risperidone group. A Similar association between total cholesterol and Olanzapine treatment was reported by other researchers [9-12].

The comparative results of the mean triglycerides level in both drug groups indicate rise of TG to 26.9% in Olanzapine group and 21% in Risperidone group after treatment. This was shown that the mean TG level increased statistically significantly (p<0.05) in both groups. The results are in agreement with other studies [13,14].

The mean HDL-C level was found to reduce by 10.3% and 6.1% Olanzapine and Risperidone group respectively. It was statistically significant (P<0.05) from baseline to endpoint of treatment in Olanzapine group while non-significant (p>0.05) in Risperidone group. Similarly the mean LDL level increased 19.5% in Olanzapine and 5.6% in Risperidone after 16 weeks of treatment. This is statistically significant (p<0.05) in Olanzapine group only. However increase in mean VLDL level was found statistically significant (P<0.05) in both groups.

Sikich *et al*. [15] study reported a non-significant decrease of HDL levels in olanzapine-treated patients after eight weeks and slightly increased HDL levels in Risperidone-treated patients. LDL and TG levels were also increased in both groups. A 2008, study conducted by Sikich *et al*. [16] on a different group of patients, however, showed different results, with a slight increase in HDL levels in olanzapine-treated patients and a decrease in HDL levels in Risperidone-treated patients after eight weeks of treatment.

LDL levels showed a slight increase in olanzapine treated patients, but they decreased in Risperidone-treated patients. TG levels were found to be increased in both the groups, while total cholesterol levels were increased in olanzapine-treated patients, but decreased in Risperidone treated patient. McEvoy *et al*. [17] study showed decrease in HDL levels but a rise in TG and total cholesterol levels in both Olanzapine, and Risperidone-treated patients after 12 weeks of treatment. The change was numerically higher in the Olanzapine treated patients.

In schizophrenic subjects Risk factor I (CHO/HDL) and Risk factor II (LDL/HDL) were increased after 12 and 16 weeks of treatment and was statistically significant (p<0.05). From our study, it was clearly evident that treatment with Olanzapine is associated with significantly higher levels of lipid and risk factors for coronary heart disease and other metabolic problems than Risperidone. Our findings are in accordance with Liberman & Jocelynemoisen [18,19].

The slight increase in the mean values of total cholesterol (TC) and LDL-Cholesterol observed in all patients of Risperidone group, but it was not statistically significant (p>0.05) when compared with the baseline corresponding values in schizophrenic subjects and our results correlated with other researchers [20,21].

CONCLUSIONS

The conclusion of our comparison study confirms that Olanzapine is associated with significantly greater risk of developing dyslipidemia than Risperidone and the risk of hyperlipidaemia is less in Risperidone than Olanzapine. Thus, our current study indicates that Risperidone is a better antipsychotic drug of choice in terms of dyslipidemia and risk of coronary artery disease in schizophrenia patients. Patients taking antipsychotics

treatment require regular screening for lipid profile and other metabolic risk factors. There is clearly a need for clinicians to employ multiple strategies to minimize metabolic risk in schizophrenia patients, including the use of metabolically more neutral medications, promoting healthier lifestyle habits, and most importantly, practicing good preventive care through regular monitoring of metabolic parameters.

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