International Journal of Sciences: Basic and Applied Research (IJSBAR)

ISSN 2307-4531
(Print & Online)

http://gssrr.org/index.php?journal=JournalOfBasicAndApplied

Effect of Anti-Psychotic Drugs on Lipid and Prolactin Level among Sudanese patients

Marwa AbdArahman Elhassan Ahmed[a*], Amna O. M. Elzein[b], Nassr Eldin Mohammed Ahmed Shrif[c]

[a,b]*Department ofClinical Chemistry , Faculty of Medical Laboratory Sciences, Alneelain University, Khartoum , Sudan.*

[c]*Department OF Clinical chemistry.Faculty of Medical Laboratory Sciences, AlzaeimAlazharyUniversity – Sudan.*

Abstract

A psychiatric medication is a licensed psychoactive drug taken to exert an effect on the chemical makeup of the brain and nervous system. Thus, these medications are used to treat mental disorders. The aim of the current study was to determine the effect of anti-Psychotic drugs on lipid and prolactin level among Sudanese psychotic patients. This cross-sectional study conducted in Altegani Almahi psychiatric Hospital, Khartoum state, Sudan, during the period of November 2015to March 2016. Seventy psychotic patients on first and second generation drugs were enrolled in this study. Any Patient had with chronic disease , receiving drugs or any that can affect lipid and hormones level were excluded. From each participant, 5 mL of blood sample was collected in plain containers during the period of steady state then serum was separated and stored at −20°C until used for analysis of lipid profile, which was measured using (Mindray instrument(BA-88Asemi-outo chemistry analyzer) , and the Concentration of prolactin level was measured by ELISA techniques (state fax model 3200) . Seventy Sudanese psychotics patients using antipsychotic drugs were enrolled in the study They were from both gender ; aged from 18-40 years . The Serum prolactin level higher in male Patients used antipsychotic rather than female (P≤0.05).

---

* Corresponding author.

Also Total cholesterol (TC) and HDLwere significantly different in using different types of drugs, however, triglyceride (TG) , and low-density lipoprotein (LDL-C) levels were not significantly different (P≥0.05). Antipsychotic drugs can cause significant abnormalities in lipid metabolism.and no difference regarding the gender .however the prolactin is significantly increased in male rather than female.

Keywords: Anti-Psychotic drugs; Lipids; Prolactin ; Sudanese.

1. Introduction

Antipsychotic medications are an important component in the medical management of many psychotic conditions.Thus, these medications are used to treat mental disorders [1]. The drug therapy in psychosis inhibit most florid subjective and behavioral disturbances of psychosis and restore the patient to as near normal to the society as possible by improving the quality of life and to decrease hospitalization [2]. The discovery of chlorpromazine and lithium in 1950‘s revolutionized the treatment of psychiatric disorders. The atypical antipsychotic agents (AAAs), which are sometimes referred to as second-generation antipsychotics (SGAs), are currently marketed in the United States for use in adults [3]. These AAAs include clozapine, risperidone, olanzapine, quetiapine, ziprasidone, aripiprazole, paliperidone, and asenapine .(risperidone, olanzapine mainly used in Sudan) , These AAAs have established efficacy in the treatment of schizophrenia and bipolar mania in adults, and are utilized in the treatment of a variety of other illnesses as well [3]. At present, risperidone and aripiprazole are labeled by the FDA for use in children or adolescents for irritability associated with an autistic disorder for risperidone and years for aripiprazole. Case reports have also described the use of clozapine in the treatment of youths with the treatment- resistant autistic disorder [4]. Risperidone of the AAAs, has the most substantive amount of methodologically stringent evidence about its use in children and adolescents. In one of the largest methodologically rigorous studies involving the use of AAAs in children, risperidone was examined as a treatment for serious behavioral problems in children with autism ages 5-17. In this multi-site trial, a total of 101 children with autism participated in a double-blind trial of risperidone, 0.5mg to 3.5mg per day versus placebo. The results from the initial study, a six-month continuation trial, and the blinded discontinuation trial found that risperidone treatment resulted in significant improvement in behavioral problems that persisted at six months and relapsed with medication discontinuation[5]. Olanzapine of the AAAs, olanzapine‟s receptor binding profile most closely matches that of clozapine. There is one double-blind, placebo-controlled study that has reported the short- term efficacy of olanzapine in the treatment of adolescents with schizophrenia. There is another double-blind, placebo-controlled study reporting the short-term efficacy of olanzapine in the treatment of adolescents with bipolar illness suffering from a manic or mixed episode. Another double-blind study, of 50 total patients, comparing olanzapine, risperidone, and haloperidol in psychotic youths found olanzapine‟s effectiveness to be comparable to both haloperidol and risperidone [6]. Quetiapine One double-blind study found that in adolescents with mania, treatment with quetiapine plus divalproex sodium was associated with greater symptom reduction than treatment with quetiapine plus placebo. In an acute, double-blind, placebo-controlled study, the efficacy of quetiapine has been reported in children and adolescents with bipolar mania [7]. Another placebo-controlled study has found that quetiapine has efficacy in adolescent schizophrenia. Open-label trials have noted potential benefit for aggression in conduct disorder, psychosis, mania, and tic disorders. Two reports in patients with PDD suggested sub-optimal effectiveness but another report suggested more positive

findings in this patient population [7]. The psychiatric medications are evolving into more novel methods of drug delivery. New technologies include transdermal, transmucosal, inhalation, and suppository supplements [8]. The Antipsychotics, which treat psychotic disorders such as schizophrenia and psychotic symptoms occurring in the context of other disorders such as mood disorders [9]. Certain antipsychotics may be associated with hyperlipidemias. These lipid abnormalities may increase the risk of coronary heart disease. Several retrospective reports [10, 11] found elevations of lipids in patients who were taking newer antipsychotics. Early case reports focused on clozapine and found elevated levels of triglycerides but not elevated total cholesterol levels [10]. One study found that olanzapine was associated with higher triglyceride and cholesterol levels, compared with risperidone [10]. Patients with schizophrenia suffer from increased rates of multiple medical problems, due to their lifestyle (high smoking prevalence, high-fat diet), inherent neglect of personal care, and barriers to treatment of physical illness [12] A further important contributor to adverse health outcomes is the side effect profile of antipsychotic medications. Since the introduction of the second generation or atypical antipsychotics (AAP), treatment with first and second-generation antipsychotics can contribute to weight gain [13, 14]. Serum lipid levels may be influenced by multiple factors, including genetics, diet, weight gain, and exogenous agents like alcohol and medications. It seems that there is an association between use of dibenzodiazepine-derived atypical antipsychotics (i.e., clozapine, olanzapine, quetiapine) and higher serum triglyceride levels [15]. Both risperidone and ziprasidone are non-dibenzodiazepine AAP, and a pear to have minimal effects on serum lipids [9, 16]] , The aim of this study was to assess lipid profile (Cholesterol , Triglyceride , High-Density Lipoprotein (HDL), Low-Density Lipoprotein LDL) and prolactin level among Sudanese patients were used anti-Psychotic drugs , referring to AlteganiAlmahipsychatric Hospital, Khartoum state .

2. Materials and Methods

This is cross section and a hospital-based study conducted in Khartoum state at Altegani Almahi psychiatric Hospital during the period of November 2015to March 2016. Seventy psychotic patients on first and second generation drugs aged between 18-40 years were enrolled in this study. Any Patient had any chronic disease, receiving drugs that can affect lipids and hormones levels were excluded. From each participant 5 mL of blood sample was collected in plain containers during the period of steady state then serum was separated and stored at −20°C until used for analysis of lipid profile, which was measured using (Mindray instrument(BA-88Asemi-outo chemistry analyzer) , and the Concentration of prolactin level was measured by ELISA techniques (state fax model 3200) . This study was approved by the faculty of medical laboratory sciences, Al neelain University, Department of clinical chemistry and informed consent was obtained from each participant before sample collection. Data analysis was performed using SPSS(Statistical Package for the Social Science) Version19.0 statistical software. Dependent variable, percentage, mean, standard Deviation and range were calculated, P values <0.05 were considered as statistically significant.

3. Results

Total of 70 Sudanese psychotic Patients (20 patients using haloperidol , 20 using olanzapine , 15 using risperidone and 15 using quetiapine) were enrolled to participate in this study, referring to Altegani

Almahipsychiatric Hospital, Khartoum state, Sudan Haloperidol was the most commonly prescribed antipsychotic followed by risperidone, quetiapine, and olanzapine (Table 2). When haloperidol, risperidone quetiapine, and olanzapine were analyzed individually for metabolic changes at 12 weeks, all the three drugs caused a significant rise in body weight. Olanzapine caused a significant rise in serum cholesterol, serum HDL, and total lipid levels. Risperidone lead to statistically was not significantly increased serum triglycerides and serum HDL while haloperidol did not cause a significant change in any of these parameters. Regarding the gender , 39 (55.7%) of the patients were males and 31 (44.3%) were females, antipsychotics drugs caused insignificant rise in serum lipid profile, however, the prolactin was significantly increased in male rather than female ($P \leq 0.05$) as shown in table I. Also Total cholesterol (TC) and HDL were significantly different in patients using different types of drugs, however, triglyceride (TG), and low-density lipoprotein (LDL-C) levels were not significantly different ($P \geq 0.05$) as shown in table II

Table 1: Comparison of lipid profile and PRL between male and female using different types of antipsychotic drugs

Parameters	**Male (M±STD)**	**Female (M±STD)**	**P. value**
TC (mg/dl)	156.00 ± 38.45	146.74 ±36.09	0.308**
TG mg/dl	96.56 ± 31.54	90.29 ± 25.51	0.372**
LDHmg/dl	98.05 ± 28.46	92.10 ± 28.28	0.386**
HDL mg/dl	55.82 ± 13.82	51.19 ± 12.38	0.150**
PRL	81.14 ± 63.66	22.10± 6.50	0.013**

**Not significant different at the 0.05 level.

Table 2: Comparison of mean (SD) of lipid profile between different types of antipsychotic drugs

Variable	Olanzapine	Quetiapine	Risperidone	Hallo Peridone	Total	P.V
TC	174.8(44.35)	140.6(26.88)	138.8(28.554)	147.4(34.416)	151.9(37.448)	0.009*
TG	100.9 (35.68)	91.3(33.07)	91.3(33.07)	93.9(22.49)	93.8(29.00)	0.540**
LDL	104.9(28.91)	87.0(17.81)	91.3(33.07)	95.3(29.57)	95.4(28.33)	0.275**
HDL	61.5(16.34)	51.9(11.27)	52.1(12.13)	48.8(8.95)	53.8(13.31)	0.014*

*Significant different at the 0.05 level.

4. Discussion

The present study shows that all antipsychotics together cause statistically significant increase in lipid profile

and prolactin. This finding is in agreement with studies done by TschonerA [15]. Moreno C [9], Gabriela B [16] they reported a significant increase in lipid profile . Our finding is in accordance with the study by Moreno C which shows that 3 months after starting treatment with second-generation antipsychotics more than 70% of patients had significant weight gain and incre prolactin level .Hampt D [17] and Pringsheim [17] . suggest that olanzapine is associated with greatest weight gain. The present study shows that all the antipsychotics taken together cause a statistically significant rise in all lipid parameters like serum total cholesterol, serum HDL, and serum prolactin . These findings are in agree with Pringsheim, Moreno C10, Tschoner A9, Wirshing D.A.20, Osser and his colleagues [18] Meyer and his colleagues [19].. A study done by Moreno C10 shows that after 3 months of therapy with second-generation antipsychotics more than 70% of patients had a significant rise in total cholesterol and low LDL which is in disagreeing with our study. Regarding atypical antipsychotics, both clozapine and olanzapine can increase blood lipid levels and this agree with Our study . Our finding is in accordance with an another retrospective analysis, comparing risk of diabetes during olanzapine use with that during risperidone use, olanzapine was associated with an increased risk of developing diabetes compared to risperidone [20]. Abnormalities in glucose metabolism have been reported with other antipsychotics like chlorpromazine with increase prevalence of diabetes [21]. However all first generation antipsychotics do not cause abnormal glucose metabolism. In our study haloperidol has not caused any significant change in blood sugar level.

5. Conclusion

Antipsychotics drugs can cause significant abnormalities in lipid metabolism regardless the gender .However the prolactin is significantly increased in male rather than female. So selection of antipsychotics, particularly the newer ones requires consideration of co morbidities like obesity, diabetes mellitus and dyslipidemias .

References:

[1]. Brink, T.L., Psychology: A Student Friendly Approach, pp120. 2008.

[2]. Brink, T.L., Psychology a student friendly approach. Unit, 2008. **5**: p. 88.

[3]. Campbell, M., J.L. Rapoport, and G.M. Simpson, Antipsychotics in children and adolescents. Journal of the American Academy of Child & Adolescent Psychiatry, 1999. **38**(5): p. 537-545.

[4]. Cooper, W.O., et al., New users of antipsychotic medications among children enrolled in TennCare. Archives of pediatrics & adolescent medicine, 2004. **158**(8): p. 753-759.

[5]. Meyer, J.M., Novel antipsychotics and severe hyperlipidemia. Journal of clinical psychopharmacology, 2001. **21**(4): p. 369-374.

[6]. Wirshing, D.A., et al., The effects of novel antipsychotics on glucose and lipid levels. The Journal of clinical psychiatry, 2002. **63**(10): p. 856-865.

[7]. Ghaeli, P. and R.L. Dufresne, Serum triglyceride levels in patients treated with clozapine. American journal of health-system pharmacy, 1996. **53**(17): p. 2079-2081.

[8]. Spivak, B., et al., Diminished suicidal and aggressive behavior, high plasma norepinephrine levels, and serum triglyceride levels in chronic neuroleptic-resistant schizophrenic patients maintained on clozapine. Clinical neuropharmacology, 1998. **21**(4): p. 245-250.

[9]. Moreno, C., et al., Metabolic effects of secondâ€generation antipsychotics in bipolar youth: comparison with other psychotic and nonpsychotic diagnoses. Bipolar disorders. **12**(2): p. 172-184.

[10]. Wilson, P.W.F., et al., Metabolic syndrome as a precursor of cardiovascular disease and type 2 diabetes mellitus. Circulation, 2005. **112**(20): p. 3066-3072.

[11]. Meyer, J.M., A retrospective comparison of weight, lipid, and glucose changes between risperidone- and olanzapine-treated inpatients: metabolic outcomes after 1 year. The Journal of clinical psychiatry, 2002. **63**(5): p. 425-433.

[12]. Sartorius, N., Physical illness in people with mental disorders. World Psychiatry, 2007. **6**(1): p. 3-4.

[13] Allison, D.B., et al., Antipsychotic-induced weight gain: a comprehensive research synthesis. American journal of Psychiatry, 1999.

[14]. Wirshing, D.A., et al., Novel antipsychotics: comparison of weight gain liabilities. The Journal of clinical psychiatry, 1999. **60**(6): p. 358-363.

[15]. Tschoner, A., et al., Metabolic side effects of antipsychotic medication. International journal of clinical practice, 2007. **61**(8): p. 1356-1370.

[16]. Balf, G., et al., Metabolic adverse events in patients with mental illness treated with antipsychotics: a primary care perspective. Primary care companion to the Journal of clinical psychiatry, 2008. **10**(1): p. 15.

[17]. Pringsheim, T., et al., Evidence-based recommendations for monitoring safety of second generation antipsychotics in children and youth. J Can Acad Child Adolesc Psychiatry. **20**(3): p. 218-233.

[18]. Reynolds, G.P., Z. Zhang, and X. Zhang, Polymorphism of the promoter region of the serotonin 5-HT2C receptor gene and clozapine-induced weight gain. American journal of Psychiatry, 2003.

[19]. Osser, D.N., D.M. Najarian, and R.L. Dufresne, Olanzapine increases weight and serum triglyceride levels. Journal of Clinical Psychiatry, 1999.

[20]. Meyer, J.M. and C.E. Koro, The effects of antipsychotic therapy on serum lipids: a comprehensive review. Schizophrenia research, 2004. **70**(1): p. 1-17.

[21]. Caro, J.J., A. Ward, and K. Robinson, The risk of diabetes during olanzapine use compared with risperidone use: a retrospective database analysis. The Journal of clinical psychiatry, 2002. **63**(12): p. 1135-1139