Issues Management Planning

Diabetes



Issue

 Diabetes is a significant liability for Zyprexa due to its impact on physicians' prescribing habits, patient's overall health, and potential additional label changes.

Our Position

When choosing a medication, side effects should be considered within the context of overall efficacy, tolerability and the
seriousness of the illness. There are no studies that demonstrate a causal relationship between Zyprexa and the development of
diabetes. Epidemiological studies suggest that diabetes may occur in patients taking antipsychotic medications at comparable
rates. Therefore the potential for a patient to develop diabetes should not be a differentiating factor when choosing antipsychotic
medications.

Evidence for Position

- High incidences of diabetes and hyperglycemia in the case of diabetes, as much as 2 to 4 times that of the general population –
 have been reported in patients with severe mental illness for more than 50 years, even before the introduction of antipsychotics.
- · Lilly Advanced PCS study, Lilly IMS Study, Janssen Health Plans Study, Janssen Quebec Medicare Study

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Rational for Position

- · Diabetes is common in the general population.
- Diabetes is more prevalent in people with severe mental illness (2-4 times greater than the general population).
- Diabetes can occur in patients taking antipsychotic medications at comparable rates.
- Therefore antipsychotic therapy should be based on the efficacy of the medication in controlling the psychiatric disorder and not focus concern on diabetes.

Marketplace Feedback

- Diabetes is associated most closely with Clozaril and Zyprexa among the atypical antipsychotics.
- · The issue has mainly been driven by competitive marketing efforts through misinterpreted scientific evidence
 - As a result, MDs tend to look for diabetes with Zyprexa patients more than with others
- · Diabetes has been elevated to the #1 concern when choosing an antipsychotic.
- Psychiatrists do not want to treat diabetes they will refer
- Many psychiatrists are willing to help patients manage weight gain
- The competition has been relentless in their attempts to equate Zyprexa use with the development of diabetes.

Customers Needs

- Diabetes education
- Ready access to consultation of endocrinologists and diabetes educators for training (CME, etc.)
- · Simple solutions to deal with the weight gain

What We Know

- Latest US MR shows that diabetes is the #1 reason physicians are concerned about potential weight gain with Zyprexa.
- Same MR shows that physicians who feel hyperglycemia is a side effect of a specific agent, 99% believe it is specific to Zyprexa.
- Physicians in the US do make conscious decisions not to prescribe Zyprexa (23%) due to concerns about diabetes and may also discontinue the use of medication (18%) due to diabetes.
- Olanzapine causes modest elevations of mean random glucose.
- There is an epidemic increase in the prevalence of DM in the US.
- 1/3 of DM is undiagnosed.
- Comparable increase in the incidence and risk of DM during treatment with antipsychotics (conventional and atypical) vs. general
 patient population.
- The TED analysis shows consistencies with well established risk factors of DM. Patients that develop DM on olanzapine and other antipsychotics have other common, often pre-treatment, characteristics (risk factors) with patients that develop diabetes and are not on antipsychotics.
- Glucose elevation correlates with weight gain.

What We Don't Know

- · The impact of olanzapine on patients already at risk of developing diabetes.
- The long term impact of Zyprexa induced weight gain on the development of diabetes.
- How to best, practically, support MD's in assessing DM risk and appropriate patient follow up.

Key Messages

- Diabetes is increasingly common in the general population
- Diabetes occurs at a higher rate (2-4 times that of the general population) in schizophrenic and bipolar patients.
- Epidemiological studies indicate comparable rates of diabetes among patients treated with antipsychotics.
- A number of factors affect risks for the development of diabetes such as: family history, aging, ethnicity, previous history of glucose intolerance, obesity, dyslipidemia, lack of exercise, hypertension, high-fat diet, excessive alcohol use, hyperprolactinemia and significant mental illness. Therefore, one should assess patients for risk factors and consider recommending preventative therapy.
- Because there is no antipsychotic which is riskier than another in causing diabetes, this should not be a differentiating factor in the selection of an antipsychotic medication.
- The primary considerations for choosing an antipsychotic should be its overall risk/benefit profile that is its efficacy in treating the psychiatric illness and its overall tolerability.

Key Messages

- Diabetes is increasingly common in the general population and occurs at a higher rate (2-4 times that of the general population) in schizophrenic and bipolar patients.
- Because diabetes is common in the population you treat, and epidemiological studies indicate comparable rates of diabetes among
 patients treated with antipsychotics, you are likely to detect diabetes in some of your patients, regardless of the antipsychotic
 medication you choose.
- PROBE: Does this information match your perceptions?
 - If Yes Transition to efficacy message
 - If no ask why?
 - If due to more weight gain offer weight management suggestions/solutions transition to efficacy message
 - If due to belief Zyprexa causes diabetes show epidemiological data and probe again
 - If doctor does not believe epidemiological data ask what would they need to see to believe and what they have seen that makes them believe differently.

Desired Evolution

Action Steps	Desired Outcome	Responsibility	Timing
 Drive in the minds of our customers that the short term risk of developing diabetes is comparable with other agents. 	Comparable rates	Affiliate level	• ASAP
 Educate psychiatrists on DM (see SCC) 	Comparable rates	Product & Affiliate Team level	
More researchPhysician perceptionsCustomer needs	Better understanding	Product Team	
Focus on delivering Zyprexa's brand promise	 Higher sales through acknowledging customer concerns about diabetes while focusing on Zyprexa's benefits to health care professionals and patients. 	Affiliate level	• ASAP

References

- 1. Kasanin J. The blood sugar curve in mental disease. The schizophrenic (dementia praecox) groups. *Arch Neurol and Psychiatry* 1926;16:414-419
- 2. Cassidy F, Ahearn E, Carroll BJ. Elevated frequency of diabetes mellitus in hospitalized man-depressive patients. *Am J Psychiatry* 1999;156:1417-1420.
- 3. Lilliker S. Prevalence of diabetes in a manic-depressive population. Compr Psychiatry 1980;21:270-275.
- 4. Charactan FB, Bartlett NG. The effect of chlorpromazine (Largactil) on glucose tolerance. *J of Mental Science* 1955;101:351-353.
- 5. Data on file, Lilly Research Laboratories
- 6. Resnick HE, Harris MI, Brock DW, et al. American diabetes association diabetes diagnostic criteria, advancing age, and cardiovascular disease risk profiles. Diabetes *Care* 2000;176:23.
- 7. Larsson H, Lindgarde F, Berglung G, et al. Prediction of diabetes using ADA or WHO criteria in post-menopausal women: a 10-year follow-up study. *Diabetologia* 2000;43:1224.
- 8. Mannucci E, Bardini G, Ognibene A, et al. Comparison of ADA and WHO screening methods for diabetes mellitus in obese patients. *Diabetic Medicine* 1999;16:579.
- 9. Puavilai G, Kheesukapan P, Chanprasertyotin S, et al. Random capillary plasma glucose measurement in the screening of diabetes mellitus in high-risk subjects in Thailand. *Diab Res Clin Prac* 2001;51:125.
- 10. Wannamethee SG, Shaper AG. Weight change and duration of overweight and obesity in the incidence of type 2 diabetes. Diabetes Care 1999;22:1266.
- 11. Allison DA, Cavazzoni P, Beasley CM, et al. Random blood glucose levels in patients with schizophrenia treated with typical and atypical antipsychotic agents: an analysis of data from double-blind, randomized, controlled clinical trials. Poster presented at the International Congress on Schizophrenia Research (ICSR); Whistler, British Columbia; April 28 May 2, 2001.

- 1. American Diabetes Association Screening for Type 2 Diabetes. *Diabetes Care*. 2000;23(suppl 1):S1-116.
- 2. Beasley CM, Berg PH, Dananberg J, Kwong KC et. al. Incidence and rate of treatment-emergent potential impaired glucose tolerance and potential diabetes with olanzapine compared to other antipsychotic agents and placebo. Poster presentation at ACNP, December 10-14, 2000. San Juan, Puerto Rico.
- 3. Harris MI, Flegal KM, Cowie CC, et al. Prevalence of diabetes, impaired fasting glucose, and impaired glucose tolerance in US adults. *Diabetes Care* 1998;21:518-524.
- 4. World Health Organization. The World Health Report 1998: Life in the 21st Century a vision for all.
- 5. Mokdad AH, Ford ES, Bowman BA, et al. Diabetes trends in the US, 1990-1998. Diabetes Care 2000;23:1278-1283.
- 6. Ford ES, Williamson DF, Liu S. Weight change and diabetes incidence: Findings from a national cohort of US adults. *Am J Epidemiology.* 1997;146:214-222.
- 7. Rewers M, Hamman RF. Risk factors for Non-Insulin Dependent Diabetes. Diabetes in America, 2nd Edition, NIH 1995, pg. 220.
- 8. Harris MI, Hadden WC, Knowler WC, et al. Prevalence of diabetes and impaired glucose tolerance and plasma glucose levels in US population aged 20-74 years. *Diabetes* 1987;36:523-534.
- 9. Foss MC, Paula FJ, Pacoloa GM, et. al. Peripheral glucose metabolism in human hyperprolactinemia. *Clin Endocrinol* 1995;43:721-726.
- 10. Keskiner A, Toumi AE, Bousquet T. Psychotropic drugs, diabetes, and chronic mental patients. *Psychosomatics* 1973;16:176-181.
- 11. McKee HA, D'Arcy PF, Wilson PJK. Diabetes in schizophrenia: A preliminary study. J Clin Hosp Pharmacy 1986;11:297-299.
- 12. Mukherjee S. High prevalence of type II schizophrenic patients. Schizophr Res 1995;15:195

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- 1. Mukherjee S, Decina P, Bocola V, et al. Diabetes mellitus in schizophrenic patients. Compr Psychiatry 1996;37:68-73.
- 2. Braceland RJ, Meduna LJ, Vaichulis JA. Delayed action of insulin in schizophrenia. Am J Psychiatry 1945;102:108-110.
- 3. Freeman H. Resistance to insulin in mentally disturbed soldiers. Arch Neurol Psychiatry. 1946;56:74-78.
- 4. Langfeldt G. The insulin tolerance test in mental disorders. Acta Psychiatr Scand 1952; 80(suppl):189-200.
- 5. Schwartz L, Munoz R. Blood sugar levels in patients treated with chlorpromazine. Am J Psychiatry 1968;125:253-255.
- 6. Waitzkin L. Glucose tolerance in man during chlorpromazine therapy. Diabetes 1970;19(3):186-188.
- 7. Thonnard-Neumann E. Phenothiazines and diabetes in hospitalized women. Am J Psychiatry 1968;7:978-982.
- 8. Korenyi C, Lowenstein B. Chlorpromazine-induced diabetes. *Diseases of the Nervous System* 1968;29:827-828.
- 9. Tollefson G, Lesar T. Nonketotic hyperglycemia associated with loxapine and amoxapine: a case report. *J Clin Psychiatry* 1983;44:347-348.
- 10. Dixon L, Weiden P, Delahanty J, et al. Prevalence and correlates of diabetes in national schizophrenic samples. *Schizophrenia Bulletin* 2000;26(4):903-912.
- 11. Kamran A, Koraiswamy PM, Jane JL, et al. Severe hyperglycemia associated with high doses of clozapine. *Am J Psychiatry* 1994;151:1395.
- 12. Koval MS, Rames LJ, Christie S. Diabetic ketoacidosis associated with clozapine treatment. *Am J Psychiatry* 1994;151:1520-1521.
- 13. Kostakoglu AE, Yazici KM, Erbas T, et al. Ketoacidosis as a side-effect of clozapine: A case report. *Acta Psychiatr Scand* 1996;93:217-218.

- 1. Peterson GA, Byrd SL. Diabetic ketoacidosis from clozapine and lithium cotreatment. Am J Psychiatry 1996;153:737-738.
- 2. Popli AP, Konicki PE, Jurjus GJ, et al. Clozapine associated diabetes mellitus. *J Clin Psychiatry* 1997;58:108-111.
- 3. Wirshing DA, Spellberg BJ, Erhart SM, et al. Novel antipsychotics and new onset diabetes. Biol Psychiatry 1998;44:778-783.
- 4. Ai D, Roper TA, Riley JA. Diabetic ketoacidosis and clozapine. Adverse Drug Reactions 1997:493-494.
- 5. Maule S, Giannella R, Lanzio M, et al. Diabetic ketoacidosis with clozapine treatment. *Diabetes Nutrition and Metabolism* 1999;12:187-188[CLW1].
- 6. Colli A, Cociolo M, Francobandiera F, et al. Diabetic ketoacidosis associated with clozapine treatment. *Diabetes Care* 1999;22:176-177[CLW2].
- 7. Thompson J, Chengappa KNR, Good CB, et al. Hepatitis, hyperglycemia, pleural effusion, eosinophilia, hematuria and proteinuria occurring early in clozapine treatment. *Int Clin Psychopharmacol* 1998;13:95-98.
- 8. Hauptmann B, Kupsch A, Arnold G. Hyperglycemia associated with low-dose clozapine treatment. *J Neural Transm* 1999;106:XII.
- 9. Smith H, Kenney-Herbert J, Knowles L. Clozapine-induced diabetic ketoacidosis. *Austr & New Zealand J Psych* 1999;33:120-121[CLW3].
- 10. Dickson RA, Hogg L. Pregnancy of a patient treated with clozapine. Psychiatr Services 1998;49:1081-1083[CLW4].
- 11. Pierides M. Clozapine monotherapy and ketoacidosis. Br J Psychiatry 1997;171:90-91.
- 12. Mohan D, Gordon H, Hindley N, et al. Schizophrenia and diabetes mellitus. British Journal of Psychiatry 1999;180-181
- 13. Hagg S, Joelsson L, Mjorndal T, et al. Prevalence of diabetes and impaired glucose tolerance in patients treated with clozapine compared with patients treated with conventional depot neuroleptic medications. *J Clin Psychiatry* 1998;59:294-299.

- 1. Henderson DC, Cagliero E, Gray C, et al. Clozapine, diabetes mellitus, weight gain, and lipid abnormalities: a five-year naturalistic study. *Am J Psychiatry* 2000;157:975-98
- 2. Wehring H, Alexander B, Perry PJ. Diabetes mellitus associated with clozapine therapy. *Pharmacotherapy* 2000;20(7):844-847
- 3. Isakov I, Klesmer J, Masand PS. Insulin-resistant hyperglycemia induced by clozapine *Psychosomatics* 2000;41(4):373-374.
- 4. Rigalleau V, Gatta B, Bonnaud S, et al. Diabetes as a results of atypical anti-psychotic drugs- a report of three cases. *Diabetic Medicine* 2000;17(6):484-6.
- 5. Gatta B, Rigalleau V, Gin H. Diabetic ketoacidosis with olanzapine treatment. *Diabetes Care* 1999;22:1002-1003[CLW5].
- 6. Ober SK, Hudak R, Rusterholtz A. Hyperglycemia and olanzapine *Am J Psychiatry* 1999;156:970[CLW6].
- 7. Fertig MK, Brooks VG, Shelton PS, et al. Hyperglycemia associated with olanzapine. *J Clin Psychiatry* 1998;59:687-689.
- 8. Lindenmayer JP, Patel R. Olanzapine-induced ketoacidosis with diabetes mellitus. Am J Psychiatry 1999;156:1471[CLW7].
- 9. Goldstein LE, Sporn J, Brown S, et al. New-onset diabetes mellitus and diabetic ketoacidosis associated with olanzapine treatment. *Psychosomatics* 1999;40(5):438-443[CLW8].
- 10. Zung A, Blumenson R, Kupchik M, et al. Are the atypical antipsychotic drugs diabetogenic? Poster presentation at 38th Annual Meeting of the European Society of Paediatric Endocrinology Warsaw, Poland, August 29-September 1, 1999. *Hormone Research* 1999;51:102.
- 11. Von Hayek DV, Huttl V, Reiss J, et al. Hyperglycemia and ketoacidosis under olanzapine. Nervenarzt 1999;70:836-837[CLW9].
- 12. Bettinger TL, Mendelson SC, Dorson PG, Crimson ML. Olanzapine-induced glucose dysregulation. *Ann Pharmacotherapy* 2000;34:865-867.
- 13. Roefaro J, Mukherjee SM. Olanzapine-induced hyperglycemic nonketotic coma. Ann Pharmacother 2001;35(3):300-302.

- 1. Bonanno DG, Davydov L, Botts SR. Olanzapine-induced diabetes mellitus. Ann Pharmacother 2001;3595):563-565
- 2. Selva KA, Scott SM. Diabetic ketoacidosis associated with olanzapine in an adolescent patient. Journal of Pediatrics 2001;138(6):
- 3. Croarkin PE, Jacobs KM, Bain BK. Diabetic ketoacidosis associated with risperidone treatment? *Psychosomatics* 2000;41:369-370.
- 4. Melamed Y, Mazek D, Elizur A. Risperidone treatment for a patient suffering from schizophrenia and IDDM. *Can J Psychiatry* 1998;43:956.
- 5. Wirshing DA, Pierre JM, Eyeler J, et al. Risperidone associated new onset diabetes. *Biological Psychiatry* 2001;50:148-149. In Press.
- 6. Sobel M, Jaggers ED, Franz MA. New-onset diabetes mellitus associated with the initiation of quetiapine treatment. *J Clin Psychiatry* 1999;60:556-557.
- 7. Procyshyn RM, Pande S, Tse G. New-onset diabetes mellitus associated with quetiapine. Canadian Journal of Psychiatry 2000;45(7):668-669.
- 8. Cavazzoni P, Baker RW, Kwong K, et al. A pharmacoepidemiologic study of diabetes mellitus and antipsychotics in the United States. Poster presented at the 41 stNew Clinical Drug Evaluation Unit, Phoenix, AZ, May 28-31 ,2001.
- 9. Mahmoud R, Gianfrancesco F, Grogg A, et al. Differential effects of antipsychotics on type II Diabetes. Findings from a large health plan database, Presented at American Psychiatric Associatino Meeting, May 5-10, 2001, New Orleans, LA.
- 10. Caro J, Ward A, Levinton C, et al. The risk of developing diabetes in users of atypical antipsychotics. Poster presented at the ACNP Annual Meeting, San Juan, PR, December 2000.
- 11. Melkersson KI, Hulting AL, Brismar KE. Elevated levels of insulin, leptin, and blood lipids in olanzapine-treated patients with schizophrenia or related psychosis. *J Clin Psych* 2000;61:742-749.

- 1. Prior TI, Chue PS, Tibbo P. Oral Glucose Challenge Test Abnormalities with Atypical Antipsychotic Use. Abstracts of the VIIth International Congress on Schizophrenia Research Santa Fe, NM. April 17th-21st, 1999; Vol. 36, page 357.
- 2. Newcomer JW, Melson AK, Selke G, et al. Atypical antipsychotic-associated changes in glucose regulation in schizophrenia may occur independent of changes in adiposity; 38th Annual Meeting of the American College of Neuropsychopharmacology; Acapulco, Mexico December 12-16, 1999 Page: 16