Effect of anxiolytics on blood sugar level in rabbits

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Anxiety disorders are more prevalent not only in normal individuals but also in diabetes mellitus. Diazepam, a benzodiazepine, and buspirone, an azaspirodecaneindione, are the most often prescribed anxiolytics. Present study was aimed to investigate the effect of diazepam and buspirone on the blood sugar levels in rabbits. Diazepam (0.5mg/kg/day p.o.) and diazepam (0.6mg/kg/day p.o.) did not affect the glucose levels in rabbits even after one month of treatment. Present findings suggest that these two anxiolytics have minimal effect on blood sugar control.

Anxiety disorders and diabetes mellitus are one of the most common psychiatric and endocrine disorders in general population, respectively. The incidence of anxiety disorders is more in diabetic patients as compared to non-diabetic ones. At present, there are numbers of anxiolytic in market belonging to different groups, out of which benzodiazepines and azaspirodecaneindione are frequently prescribed. Diazepam is most common benzodiazepine prescribed. Although benzodiazepines exert effect very rapidly possibly even after first dose, their use may be limited due to addiction, dependence, and tolerance development. Buspirone an azaspirodecaneindione appears to have similar anxiolytic efficacy to benzodiazepines but it has slow onset of action. Certain advantages over benzodiazepines are lack of sedation, dependence and less motor impairment that make this drug favorable anxiolytic.

The blood sugar homeostasis is a very complex mechanism involving number of hormonal and nonhormonal substances acting through various receptors. The blood sugar level can be influenced by many factors including drugs. The dysregulation of control of blood sugar level has importance in diabetic as well as nondiabetic persons. There is report regarding the effect of anxiolytics on the hypoglycemic action of oral hypoglycemic drugs. Anxiolytics have also shown to alter the lipid profile in humans. However, there is no study reported in literature regarding the effect of anxiolytics per se on the blood sugar level in normal population. Present study was therefore, conducted to see the effect of anxiolytics, diazepam and buspirone the prototype members of most commonly prescribed anxiolytic subgroups on the blood sugar levels in rabbits.

Present study was conducted in 24 albino rabbits (wt.1.5-2 kg) of either sex. Animals were kept under standard laboratory conditions and were fed on commercial pellet diet (Lipton India Ltd.). The rabbits were divided into 3 groups of 8 animals each. Animals of group 1 received saline (2 ml/kg/day p.o.), group 2 received diazepam (0.6 mg/kg/day p.o.) and group 3 received buspirone (0.5 mg/kg/day p.o.) between 7-8 am for 30 days. Animals were fasted for overnight at the day of blood sampling, at days 1, 7, 14, and 30. Blood samples (1 ml) were collected in vial from the marginal vein of pinna at 0, 1/4, 1, 2, 4, 6, 12 and 24 hr after drug administration at above mentioned days. Blood sugar levels were measured by the method given by Somogyi. Blood sugar level of each animal at 0 hour (basal) was considered 100% and percentage change in blood sugar levels at different time intervals were calculated separately for each animal. Results for each group were expressed as percentage change in blood sugar (mean ± SE) at various time intervals. Results of diazepam treated group and buspirone treated groups were separately analyzed with that of control group using Student’s t test and P<0.05 was considered as statistically significant.

Figure 1 shows the values obtained at day 30. Diazepam and buspirone pretreatment has altered the normal patterns of blood levels in rabbits but the...
changes are statistically not significant. The basal (0 hr) blood sugar levels mean ± SE for each group at days 1, 7, 14, and 30 are given in Fig. 2. The basal blood sugar levels within same group at day 7, 14, and 30 did not show any significant difference when compared with that of day 1. Results show that even long-term treatment with diazepam and buspirone does not affect blood glucose levels.

Certain neuroleptics have shown to alter the glucose metabolism. It has been proposed that benzodiazepines like chlordiazepoxide may increase the insulin requirement in diabetics indirectly indicating that it may dysregulate normal blood glucose control mechanism. In our study, we could not find such alterations in blood glucose levels. Buspirone has dopaminergic, noradrenergic, and serotonergic modulating properties however, its anxiolytic action appears to be related to its action on 5-HT receptors. There is clear cut role of serotonin, dopamine, noradrenaline in normal blood glucose control mechanism. Our proposed hypothesis that the involvement of these receptors in action of buspirone was not supported by the data obtained. Multiple hormonal and nonhormonal factors are involved in normal blood glucose regulation and the effect of buspirone may have been compensated by the other regulatory mechanisms. Based on present findings, it can be proposed that diazepam and buspirone appear not to influence the blood sugar levels in rabbits. Further clinical trials on these lines might indicate the safety of these drugs as far as the blood glucose control is concerned.

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References