A STUDY ON THE EFFECT OF BLOOD SUGAR LEVELS IN PSYCHIATRIC PATIENTS TREATED WITH RISPERIDONE

SASIKALA G GOPAL
Department of Pharmacology, STANLEY MEDICAL COLLEGE AND HOSPITAL

Abstract: This study was designed to evaluate the effects of risperidone on Blood glucose in patients with psychiatric illness. Method Thirty non-diabetic patients with Psychiatric illness (e.g. schizophrenia, manic phase of bipolar disorder based on Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition criteria) included in this study. These patients did not receive any drug that would alter the blood sugar levels and also risperidone for at least two weeks prior to the initiation of the study. All the patients who were included in this study receive the mean dose of 4mg/day (range 2-8 mg) of risperidone for eight weeks, depending upon the clinical condition. The patients fasting, postprandial blood sugar and weight gain were evaluated at the baseline and then at four weeks and at eight weeks. Results Thirty patients completed the study. The mean fasting blood sugar level was increased from 87.5 mg/dL (baseline) to 101.7 mg/dL at week 8 (P 0.001). There was also statistically significant weight gain with an increase in mean weight of 59.16 kg to 59.96 kg (P 0.001). The 8-week study showed that fasting blood sugar and postprandial blood sugar levels may increase in psychiatric patients receiving risperidone. There was also definite weight gain. No serious adverse events were reported. Conclusion Measuring and monitoring fasting postprandial blood sugar before the initiation and during the treatment with risperidone is suggested.

Keyword: Blood glucose, Risperidone, Psychiatric illness.

INTRODUCTION: Phenothiazines and other older antipsychotics drugs are being replaced by atypical antipsychotics. Atypical antipsychotics have a low risk of adverse extrapyramidal effect. The effectiveness against negative and positive symptoms of schizophrenia is attributed to their high affinity to 5HT2A and D4 receptor and also antagonistic action against alpha...
Weight gain is common with Phenothiazines, Haloperidal, Thioxanthenes and Atypical antipsychotics like olanzapine, Clozapine. Weight gain is less common with Risperidone, Quetiapine, Ziprasidone which are also atypical antipsychotics. Psychiatric patients need long term treatment with antipsychotics. Weight gain produced by antipsychotics may increase the risk of new onset Type2Diabetes mellitus. Weight gain and development or exacerbation of Diabetes mellitus are serious issues that have forced clinicians to vigilantly follow up their patient's metabolic profile to prevent serious consequences. Studies have shown that use of risperidone in non diabetic schizophrenic patients cause increase in the levels of fasting blood sugar levels from the baseline values. Hence this study stresses the monitoring of the fasting blood sugar during the treatment with risperidone. Many drugs cause diabetes mellitus and these are antipsychotics risperidone, olanzepine, clozapine in particular, and also other drugs like thiazide, B blockers, corticosteroids phenytoin sodium, tacrolimus, estrogen, progesterone preparation and certain antidepressents. US regulators have proposed that 6 antipsychotics medication can increase the risk of impaired glucose tolerance and diabetes. These drugs are risperidone, olanzapine, clozapine, quetiapine, ziprazidone, aripiprazole. Hence it was decided to conduct a study using risperidone in non diabetic psychiatric patients to find out if risperidone really causes changes in glucose tolerance, and has been designed accordingly.

In this study already known diabetics and those diagnosed to have diabetes mellitus at the time of study were not included because this study is to find out the effect of risperidone on blood sugar level who are having normal blood sugar level.

If it is found out Risperidone produces Carbohydrate intolerance, then the study could also be conducted on diabetics.

**Methodology**

Inclusion criteria:
1. All psychiatric patients who would benefit from risperidone. (e.g. schizophrenia, manic phase of bipolar disorder)
2. Age: 30-65 years
3. Patient without preexisting Diabetes mellitus / Hypertension
4. Psychiatric patients with near normal dietary intake
Exclusion criteria:

1. All old cases who are already on antipsychotics
2. Those who are on diabetes mellitus/hypertension treatment
3. Age: less than 30 years or more than 65 years
4. Those with other systemic illness
5. Acute uncontrollable cases of psychosis

Table 1 shows the sex distribution among the study patients.

Figure 1: Bar diagram representing the percentage of sex distribution.

Mean age of the participants were 52. Among this sixty two percent were male and thirty eight percent were female. Twenty males and ten females completed the study.

Table 1

<table>
<thead>
<tr>
<th>Sex</th>
<th>Value</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>29</td>
<td>96.7</td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>33.3</td>
</tr>
<tr>
<td>Total</td>
<td>39</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Figure 2: Graph showing the mean fasting blood sugar levels.
Table 2

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Devi</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>FB S_8</td>
<td>87.56</td>
<td>8.650</td>
<td>6</td>
</tr>
<tr>
<td>BL FB</td>
<td>94.56</td>
<td>5.870</td>
<td>7</td>
</tr>
<tr>
<td>FB S_8</td>
<td>101.76</td>
<td>4.809</td>
<td>8</td>
</tr>
</tbody>
</table>

FBS-BL _Fasting blood sugar-baseline
FBS-4W - Fasting blood sugar-4th week
FBS-8W_ Fasting blood sugar-8th week
Table 2 shows the increase in mean fasting blood sugar level from baseline to eight weeks.

Figure 2 shows the Bar diagram representing the increase in mean fasting blood sugar level. The mean FBS level was increased from 87.56 mg/dl (baseline) to 94.56 mg/dl at 4 week and 101.76 mg/dl at 8 weeks. The FBS levels at 8 weeks were significantly different from baseline FBS levels (p<0.001)

MEAN POSTPRANDIAL BLOOD SUGAR: Table 3

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>PPBS_BL</td>
<td>111.68</td>
<td>7.366</td>
<td>90</td>
</tr>
<tr>
<td>PPBS_4W</td>
<td>127.12</td>
<td>8.253</td>
<td>76</td>
</tr>
<tr>
<td>PPBS_8W</td>
<td>147.88</td>
<td>6.718</td>
<td>96</td>
</tr>
</tbody>
</table>

Figure 3. Bar diagram representing the mean increase in the mean postprandial blood sugar level. The mean PPBS was increased from 111.68 mg/dl (baseline) to 127.12 mg/dl at 4 week and 147.88 mg/dl at 8 week. The PPBS level at 8 week were significantly different from baseline PPBS level (p<0.001)

MEAN BODY WEIGHT: Table 4

<table>
<thead>
<tr>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>BW_BL</td>
<td>59.16</td>
<td>6.693</td>
<td>46</td>
</tr>
<tr>
<td>BW_4W</td>
<td>59.49</td>
<td>6.703</td>
<td>46</td>
</tr>
<tr>
<td>BW_8W</td>
<td>59.96</td>
<td>6.718</td>
<td>46</td>
</tr>
</tbody>
</table>

Figure 4. Bar diagram representing the mean increase in the body weight. The patient’s Body weight was increased from 59.16 (baseline) to 59.49 at 4 weeks and 59.96 at 8 weeks. The weight gain was statistically significant (p=0.001)
Discussion:
In this study the effect of risperidone on blood glucose level in non diabetic patients of psychiatric illness showed there was significant increase in both fasting and post prandial blood glucose level at the end of 4weeks and at the end of 8 weeks. Though there is increase in both FBS and PPBS level in patients treated with risperidone, at the end of 4week and at the end of 8week, the increases are well within normal limits. There was also statistically significant increase in body weight as shown in the table. The mechanism by which risperidone causes increase in blood sugar level was not fully understood. However the proposed mechanisms are; weight gain, insulin resistance increase in leptins concentration and glucose transport impairment.
Therefore regular monitoring of blood glucose before starting risperidone to prevent further complication is necessary.
The studies show that there is definite increase in FBS, PPBS in patients who have given risperidone. As noted already all the patients were non diabetics. The effect of risperidone in blood sugar level in patients who are preexisting diabetics has not been studied till now. In such cases risperidone and other antipsychotics as mentioned in the initial part of the study, may aggravate preexisting diabetics, when risperidone is given to treat the psychiatric illness. This may interfere with control of blood glucose level and it may be necessary to increase the dosage of anti diabetic drugs. In this study it has been shown risperidone definitely impairs glucose tolerance. Only further studies can establish the role of risperidone in interfering glucose tolerance.
From this study it has also transpired that blood sugar levels should be estimated in all the patients receiving risperidone, if not, in all the patients at least in those who are potentially diabetics. Since atypical antipsychotics becoming popular blood sugar monitoring also becoming essential. Since the drug also causes weight gain, only further studies can prove, if risperidone causes weight gain in diabetics also.
Some anti diabetics (sulfonylureas) cause weight gain, so combined effects of anti diabetics and risperidone also should be evaluated. Such studies will establish the link between risperidone and rise in blood sugar level and weight gain.
In this present study, patients are receiving different doses of risperidone ranging from 2mg to 8mg, where another study is required, in such a way that all the patients in study group are administered a fixed dose of risperidone every day. This can be done by careful selection.
But this study also has limitation, like it has been studied only on very small groups and also for very short period.
Conclusion:
Risperidone definitely causes increase in blood sugar level. In this study this has been shown in non diabetic patients. Glucosetolerance test should be done at regular intervals in patients who are receiving risperidone.
References:
1. H.L Sharma K. K. Sharma 2nd edition pg454
2. Goodman & Gilman 11th edition pg480

4 Ronald A. Codaria Type 2 diabetics, pre-diabetics and metabolic syndrome. 2nd Edition; page no: 20
