DRUG PRESCRIBED TO DIABETIC PATIENTS AND EFFECTIVENESS OF COMBINATION AND MONOTHERAPY

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ABSTRACT

Objectives: To study the pattern of drug prescribed to diabetic patients & the effectiveness of combination & mono therapy. Method: We took a survey of primary & tertiary care hospitals to gather the data for this study randomized diabetic patients of type 1 & type 2 diabetes of different age, gender & conditions. Results: We included 110 patients for this study to check the effectiveness of combination & mono therapy in diabetic patients. Out of 110 patients we found 37 patients on mono therapy of metformin & the % effectiveness was 32%, 30 patients on insulin monotherapy, 13 patients taking combination therapy of insulin plus metformin & the % effectiveness was 54%, combination therapy of metformin plus sulphonyl urea were taken by 22 patients among which only 3 patients were on effective therapy & % effectiveness was found to be 14%. The result shows that combination of insulin plus metformin is more effective than the combination of metformin plus sulphonylurea & mono therapy of insulin & metformin. Conclusion: Combined therapy with insulin plus oral agents is widely used and has been shown to be effective in improving glycemic control in many short-term studies. When oral therapy is continued during insulin therapy, enhancing effectiveness of endogenous insulin control with similar hypoglycemic risk, or equal glycemic control with less hypoglycemia

Keywords: survey, combination therapy, monotherapy.

INTRODUCTION

Diabetes mellitus (DM) is a major health growing problem and an important cause of prolong ill health and early death. It was the sixteen leading cause of global mortality in 1990 [1]. DM is a chronic progressive metabolic disorder characterized by hyperglycemia mainly due to absolute (Type 1 DM) or relative (Type 2 DM) deficiency of insulin hormone. DM virtually affects every system of the body mainly due to metabolic disturbances caused by hyperglycemia [2].

Diabetes results from the failure of the pancreas to produce a sufficient amount of insulin. Hormone that regulates the body’s use of glucose is insulin the pancreas produces a sufficient amount of insulin, but if the insulin is blocked from the body's cells and cannot be used. This causes patients to have abnormally high amounts of sugar in their urine and blood. Diagnosing a patient with diabetes is more complicated than measuring the glucose level of urine only one time. The diagnosis involves several hours of glucose-tolerance tests (GTT). These tests measure the rate in which sugar is removed from the bloodstream and after the test are complete, high glucose level indicates insufficient insulin and the patient is diagnosed with diabetes[3]

Metformin plays a vital role in the treatment of patients with type 2 diabetes. Metformin decreases basal glucose output by suppressing gluconeogenesis and glycogenolysis in liver and increasing glucose disposal in muscle tissue. According to a recent review, the reported risks of hypoglycemia for metformin users varied between 0 and 21%. Since metformin does not directly stimulate insulin secretion.Hypoglycemia in those patients using metformin may occur in association with strenuous physical activity or fasting.

Hypoglycemia is a major concern for users of sulfonylureas. In an observational study the risk for a first hypoglycemia diagnosis associated with sulfonylurea use was 1.8% . Additionally, no previous study quantified both the risk of developing lactic acidosis and hypoglycemia among users of sulfonylureas or metformin in the same study population. Therefore, we conducted an observational study to compare the effectiveness and hypoglycemia among users of metformin, sulfonylureas, or other oral anti diabetes drugs [4].

Metformin is often recommended as the first line drug in patients with type 2 diabetes. Because of disease progression, a substantial proportion of these patients eventually end up on insulin, at which point doctors are recommended to continue metformin use. The rationale behind this combination mainly relates to suggested beneficial metabolic effects, such as reduced blood glucose and body weight. [5]

METHODS

A randomized study on 110 diabetic patients of both type 1 and 2 was conducted, the samples were on different anti diabetic agents either as a mono therapy (metformin, insulin, sulphonylurea) or as combinations (insulin, metformin; sulphonylurea, insulin sensitizers). Patients were adults and geriatrics of both the genders and different BMI, we determine the pattern of drug use in them and keep a check on fasting and random blood sugar levels to have an idea about the effectiveness of treatment they are on.

RESULTS AND DISCUSSION

We collected data of 110 diabetic patients and studied the prescription pattern and the effectiveness of the different drugs prescribed. Most of the patients were aged between 30-75 years. They had Type 2 Diabetes mellitus. The patients were either on monotherapy consisting of insulin, metformin or sulphonyl urea or they were on combination therapy. We found that the most commonly prescribed drug in the patients was metformin (37, 33.6 %) followed by Insulin (30, 27.27%), metformin with sulphonyl urea (22,20%), metformin plus insulin (13, 11.81%) and sulphonylurea (2, 1.81%). Metformin as the most commonly prescribed drug was established in a study by Ethiraj Dhanaraj et al. (6) In our study we found that the most effective drug in monotherapy is metformin (12, 18.18%). Out of 110 patients which were being studied, 66 patients were on mono therapy. Among them 37 patients were taking metformin.12 patients who were taking metformin had blood glucose levels within range. Inulin (11, 16.66%) was the second most effective drug in mono therapy. 30 patients were taking insulin among whom 11 patients who were taking insulin had blood glucose levels within range.42 patients were prescribed combination therapy from 110 patients who were studied. Among them 22 patients were on metformin and sulphonyl urea (22, 32.3%), followed by metformin and insulin (13, 30.95%), metformin & insulin sensitizer (2, 4.76%), sulphonylurea & insulin (1, 2.3%), others (2, 2.3%).The most effective combination of drugs in combination therapy category was insulin & metformin (16.66%).
Table 1: Patient characteristics (n %)

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of patients</td>
<td>110</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>45</td>
</tr>
<tr>
<td>Female</td>
<td>65</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>20-40</td>
<td>23</td>
</tr>
<tr>
<td>41-60</td>
<td>63</td>
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<tr>
<td>61-80</td>
<td>24</td>
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<tr>
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<tr>
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</tr>
<tr>
<td>Normal</td>
<td>65</td>
</tr>
<tr>
<td>Obese</td>
<td>27</td>
</tr>
</tbody>
</table>

Figure 1: Duration of diabetes in patients

Figure 2: No. of patients on exercise

Figure 3a: Patients on monotherapy
Figure 3b: Patients on combination therapy

Figure 4a: Metformin

Figure 4b: Insulin
Figure 4c: Sulphonyl urea

EFFECTIVENESS OF COMBINATIONS

Figure 5a: Insulin + Metformin

Figure 5b: Metformin + Sulphonyl urea
Figure 5c: Insulin + Sulphonyl urea

Figure 5d: Sulphonyl urea + Insulin + Metformin

Figure 5e: Insulin + Metformin + Sulphonyl urea
We found out that most people didn’t monitor their glucose levels regularly and most weren’t doing or advised any form of exercise and diet control. These are important for glycemic control in Type 2 diabetic patients. Hence the patients should be counseled about the importance of diet control and exercise. Also they should be advised to monitor their blood glucose levels regularly so that appropriate drug regimen should be prescribed according to their needs.

We also determined that combination therapy isn’t being prescribed much although it is found in literature that most experts prefer combination therapy over monotherapy [7-9]. Therefore, the doctors should seek alternatives when they see that their target for glucose level within normal range is not being met.

CONCLUSION

Diabetes is a lifelong disease with no cure therefore it should be managed properly to slow down the advancement of this disease and the associated co-morbidities and enhance the quality of life of the patient. This can be done by prescribing a proper drug regimen consisting of hypoglycemic agents as well as diet control and exercise. Efforts from both patients and the physician should be made to meet the target glucose levels and have a better and healthy life.

REFERENCES


5. Comparison of metformin and insulin versus insulin alone for type 2 diabetes: systematic review of randomised clinical trials with meta-analyses and trial sequential analyses, 19 april 2012.


