Need and Utility of Glimepiride in Developing Countries

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Abstract

Apart from effectiveness in terms of desired glycemic control, the cost of medication is a factor of immense importance for consideration in the management of diabetes mellitus, especially in developing countries. In this regard, modern sulfonylureas, such as glimepiride, hold a central position in the therapy of type 2 diabetes mellitus even in developing countries, because of its low cost of therapy. Glimepiride is the most commonly used antidiabetic drug in combination with metformin, worldwide. Here we discuss how the cost-effectiveness factor makes glimepiride the drug of choice in developing countries for the management of type 2 diabetes mellitus.

Introduction

Chronic diseases, such as diabetes mellitus, are associated with substantial economic implications, particularly in developing countries like India.[1] Sulfonylureas (SUs) are widely used as second-line agents in the management of type 2 diabetes mellitus, in most countries of the Middle East and North Africa region (MENA), Africa, and South-East Asia.[2] This is because in case of developing countries, there is a particular need for the cost-benefit evaluation of medications, apart from desired glycemic control and lower adverse effects like hypoglycemia. In this context, modern SUs, such as glimepiride, have been found to be the most cost-effective medication.[3] In this context, we discuss the utility and need of the use of modern SUs, such as glimepiride, in the management of type 2 diabetes mellitus, in developing countries.

Table 1: Comparison of the cost involved with various antidiabetic drugs in combination with metformin therapy

Antidiabetic drug as add-on to metformin	Cost
Insulin (Usually basal)	Variable[5]
Sulfonylurea	Low[5]
Thiazolidinedione	High[5]
DPP-4 Inhibitor	High[5]
GLP-1 receptor agonist	High[5]
SGLT2	High[3]
AGI	Moderate[3]
Colesevelam	Moderate[3]
Cycloset	Moderate[3]

DPP-4: Dipeptidyl peptidase-4; GLP-1: Glucagon-like peptide-1; SGLT2: Sodium-glucose co-transporter-2; AGI: Alpha-glucosidase inhibitor

Cost-Effectiveness as a Key Determinant for Preference of Modern SUs (Glimepiride) in Developing Countries

Due to direct effects on drug utilization and patient compliance, medication cost is a primary determinant while considering disease management in underdeveloped and developing countries. People with diabetes who are below the poverty line and without any medical insurance, face numerous challenges while using expensive antidiabetic medications.[2] It has been estimated that in India, per prescription, the average number of antidiabetic drugs is 1.4, while the mean cost of prescription for each month in INR 354.60±305.72.[4]

Given the frequent use of SUs, such as glimepiride in fixed-dose combinations (FDCs), a systematic review compared the patient adherence and medical costs of loose-pill combination therapy with FDC therapy. The review suggested that compared to loose-pill combination therapy, better patient adherence, lowered direct medical costs, and improved satisfaction were observed in people on FDC therapy.[2] Table 1 represents comparison of the relative cost involved with various available antidiabetic drugs in combination with metformin.[3,5]

Affordability of SUs Such as Glimepiride

Apart from efficacy of treatment, cost of medication is an important consideration for people with type 2 diabetes mellitus in South Asia, especially for those who are not covered under any medical insurance. Apart from the low cost of medication, the use of SUs, such as glimepiride, in type 2 diabetes mellitus management have been supported by several evidences on their efficacy, improvement in long-term outcome, and extensive experience. All these benefits added to low cost have placed SUs such as glimepiride as the preferable oral antidiabetic drug for the management of type 2 diabetes mellitus, especially in developing countries that are limited in resource. In addition, as compared to the newer anti-hyperglycemic agents, modern SUs offer comparable or even superior glycemic control efficacy, apart from being a reasonable and cost-effective alternative. Overall, as compared to other therapeutic regimens, modern SUs, such as glimepiride, fare better for being associated with a lower economic burden.[4]

Evidence from Studies on Cost-Effectiveness of SUs Such as Glimepiride

In order to compare the cost-effectiveness of metformin plus glimepiride with metformin plus teneligliptin in people with type 2 diabetes mellitus, Tandon et al. performed a pharmacoeconomic analysis. This was an observational, randomized, prospective, comparative

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study on Indian people with type 2 diabetes mellitus, conducted over eight weeks. After eight weeks, by calculating the expense incurred on 0.1% reduction in HbA_{1C} and 1 mg/dL reduction in post-prandial plasma glucose or fasting plasma glucose (FPG), in both groups, the cost-effectiveness analysis was done. The outcome of the study revealed that metformin plus glimepiride combination was more effective in lowering HbA_{1C} and FPG levels. In addition, a combination of metformin and glimepiride was a significantly more cost-effective therapy vs. metformin plus teneligliptin.[1]

An analysis by Zhang et al. in 2014 evaluated the medication costs of second-line agents in type 2 diabetes mellitus management and reported the difference between the base-case cost and the expected medication cost per quality-adjusted life-year (QALY). The findings revealed that while metformin costs 81.75 USD/month, glucagon-like peptide-1 receptor (GLP-1 receptor) agonist costs 325.97 USD/month, dipeptidyl peptidase 4 (DPP-4) inhibitors costs 232.84 USD/month, insulin therapy costs 245.70 USD/month, and SU therapy costs 54.85 USD/month. It is quite evident from this cost comparison that on the basis of medication cost, SUs should be the preferred drug of choice to be used as an add-on to metformin, Overall, the lower cost of SUs, with efficient glycemic control and tolerability present SUs as the prime choice of treatment in people with type 2 diabetes mellitus.[2]

It was found in a study that for a particular financial year in sub-Saharan Africa, the medication cost of diabetes mellitus was 138 USD per patient per year, which was equivalent to 8.1% of the total budgeted health expenditure. In contrast, SUs significantly lower cost burden per QALY.[2]

Glimepiride as a Drug of Choice in Terms of Efficacy and Cost-Effectiveness

Among the different SUs, the combination of metformin and glimepiride is available in most of the countries of MENA, Africa, and South-East Asia. The Indian National List of Essential Medicine was updated in 2015, considering the best-suited therapeutic options in type 2 diabetes mellitus after careful evaluation of their efficacy, safety, and cost. Subsequently, glibenclamide was replaced with glimepiride in the diabetes category.[2] In a study on people with type 2 diabetes poorly controlled with metformin monotherapy, it was observed that the use of glimepiride as an add-on to metformin was associated with faster glycemic control, lower low-density lipoprotein, and total cholesterol, along with reduced short-term healthcare costs, vs. the use of pioglitazone as an add-on to metformin that resulted in a higher rate of peripheral edema.[5]

It has been recommended by the South Asian Federation of Endocrine Societies that owing to better glycemic control, low medication cost, and improved long-term outcomes, the use of SUs as a front-line agent should be continued in the type 2 diabetes mellitus treatment algorithm, especially in South Asia.[4]

Conclusion

Apart from efficacy in the management of type 2 diabetes mellitus, low cost of therapy is a very crucial factor for consideration in developing countries like India. In this context, modern SUs, such as glimepiride, are still placed in the central position in nearly all the recommendations and guidelines for the treatment of type 2 diabetes mellitus. Given the accumulating evidences in terms of both glycemic control efficacy, a relatively safe-to–use profile in terms of adverse effects and cost-effectiveness, the need and utility of modern SUs, such as glimepiride, is likely to persist in the management of type 2 diabetes mellitus.

Conflict of Interest

BKR is an employee of Sanofi India. All other authors report no conflicts of interest.

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