Effects of Changeover from Voglibose to Acarbose on Postprandial Triglycerides in Type 2 Diabetes Mellitus Patients

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ABSTRACT

Introduction: In this study, we examined the effects of the α-glucosidase inhibitors acarbose and voglibose on postprandial plasma glucose and serum triglyceride levels in patients with type 2 diabetes mellitus. Methods: Twenty-one Japanese patients with type 2 diabetes were enrolled in this study. Subjects had been treated with voglibose for at least 3 months. They underwent a 400 kcal balanced food meal tolerance test before and 8 weeks after the changeover from voglibose to acarbose. Subjects were divided into two groups: the first group (low-dose group; n=11) was changed over from 0.6 mg/day voglibose to 150 mg/day acarbose, and the other (high-dose group; n=10) from 0.9 mg/day voglibose to 300 mg/day acarbose. Results: The increment rate of postprandial plasma glucose ([plasma glucose 2 hours after test meal – fasting glucose]/fasting glucose) decreased from 34.7±23.9% to 25.0±24.6% (P=0.13) in the low-dose group, and decreased significantly from 56.1±53.1% to 31.5±36.0% (P=0.03) in the high-dose group after changeover. However, there were no significant changes in blood glycated hemoglobin (HbA1c) levels before and after changeover in either group. The increment rate of postprandial serum triglyceride (TG) ([serum TG 2 hours after test meal – fasting TG]/fasting TG) decreased significantly only in the high-dose group (52.4±60.0% to 24.3±16.6%) (P=0.05). No significant changes in serum high-density lipoprotein cholesterol levels were observed in either group, whereas serum low-density lipoprotein cholesterol levels decreased significantly from 3.20±0.25 to 2.65±0.18 mmol/L (P=0.04), only in the high-dose group. Conclusion: In patients with type 2 diabetes our findings suggest that acarbose 300 mg/day is superior to voglibose 0.9 mg/day in improving postprandial hyperglycemia and hypertriglyceridemia.

Keywords: acarbose; postprandial hyperglycemia; postprandial triglycerides; type 2 diabetes; voglibose
INTRODUCTION

Several studies have confirmed that a high postprandial glucose level is a greater risk factor for atherosclerosis and cardiovascular disease than high fasting glucose levels in individuals with both impaired glucose tolerance and diabetes.1-3 The mechanism by which a sudden postprandial increase in glucose, or “glucose spike,” increases the risk of cardiovascular events, is thought to be acceleration of vascular oxidative stress that inhibits the vascular endothelium, resulting in progression of atherosclerosis.4

In addition, hyperlipidemia is a major risk factor for cardiovascular disease, and type 2 diabetes patients frequently have abnormalities of lipid metabolism resulting in atherosclerotic vascular disease.5 A recent study demonstrated that postprandial hyperlipidemia is a major risk factor for coronary artery disease.6 In type 2 diabetes patients, treatment of not only postprandial hyperglycemia but also postprandial hyperlipidemia may be very important to inhibit the progression of atherosclerotic vascular disease.

Alpha-glucosidase inhibitors (α-GI), which lower postprandial plasma glucose by delaying the absorption of sugars from the digestive system, are used widely as monotherapy or in combination with other antidiabetic treatments.7-10 However, there has been some variability of clinical effects of α-GIs in diabetes patients and healthy subjects.11,12 Some differences have also been reported in the degree of improvement in postprandial plasma glucose between two α-GIs, acarbose and voglibose, although the findings have been inconsistent.13,14 Slight differences are also seen in the degree of inhibition of intestinal enzymes.15

There have also been several reports that α-GIs not only improve postprandial glucose, but also have favorable effects on lipid metabolism.16,17 Recent studies have demonstrated that acarbose improves lipid metabolism, lowering low-density lipoprotein cholesterol (LDL-C) levels, raising high-density lipoprotein cholesterol (HDL-C) levels,18 and lowering preprandial triglyceride (TG) levels.17 There have been few studies directly comparing the effects of acarbose and voglibose treatment on postprandial triglycerides directly.

In this study, we examined the effects of two α-GIs on postprandial glucose and lipid metabolism in a changeover study from voglibose to acarbose.

MATERIALS AND METHODS

Study Population

We enrolled 21 patients attending Dokkyo Medical University Hospital with type 2 diabetes and glycated hemoglobin (HbA1c) >6.5%, who had been on voglibose treatment for at least 3 months, and who met the following eligibility criteria: (1) fasting serum TG <1.71 mmol/L; (2) serum creatinine <2.0 mg/dL; (3) HbA1c <9.0%; (4) no concomitant use of fibrates, thyroid hormone, or corticosteroids hormone; (5) no changes in medications during the previous 3 months; (6) not receiving advice for lifestyle at changeover; (7) outpatients. We also excluded potential subjects with a history of stroke or other cardiovascular event. Concomitant treatments were stable and maintained unchanged as much as possible throughout the study period. All subjects gave informed consent to participate in this study. This study was performed according to the Declaration of Helsinki guidelines.

Subjects were divided into two groups: the first group (low-dose group) was changed over from 0.6 mg/day voglibose to 150 mg/day acarbose (n=11), and the other (high-dose group) from 0.9 mg/day voglibose to 300 mg/day acarbose (n=10). No changes were made in other hypo-