Comparison of acarbose monotherapy and voglibose monotherapy on incretin secretion and postprandial dyslipidemia in patients with type 2 diabetes: a randomized controlled study

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Background and objective

An α -glucosidase inhibitor has modulating effect on postprandial glucagon like peptide 1 (GLP-1) secretion or postprandial hyperlipidemia. Acarbose, an α -glucosidase inhibitor reduces the risk of IGT progressing to type 2 diabetes mellitus (T2DM), and it prevented the development of cardiovascular disease in the STOP-NIDDM trial. However, it remains unknown whether α -glucosidase inhibitor monotherapy has the effects on postprandial metabolism in addition to postprandial hyperglycemia in T2DM.

In the present study, we compared the effects of acarbose and voglibose monotherapy on GLP-1 secretion and postprandial dyslipidemia in patients with T2DM.

Materials and methods

Study population

Type 2 diabetes patients who were not taking any glucose-lowering agent for at least 12 weeks were recruited into the study.

Inclusion criteria

Fasting plasma glucose less than 140mg/dL, HbA1c <7.0%, without any glucose-lowering agent for at least 12 weeks.

Exclusion criteria

Previous use of α -glucosidase inhibitor, DPP-4 inhibitor, GLP-1 analog within 3 months, severe ketosis, diabetic coma, severe hepatic dysfunction or severe kidney dysfunction, severe infection or serious trauma, perioperative patients or severe injury, hypersensitivity to any ingredient of voglibose or acarbose, severe neuropathy, current treatment with steroid, patients judged by the investigator to be ineligible for some other reason.

Intervention

All eligible patients were randomized (1:1) to treat with either acarbose 100mg tid (Group A) or voglibose 0.3mg tid. (Group V)

Before and after the 12-week, all patients underwent a 180-min meal tolerance test (MTT) performed in the morning after an overnight fast. For breakfast, patients received a test meal (JANEF E460F18: total calories, 460 kcal; carbohydrates, 56.5 g; fat, 18.0 g; protein, 18.0 g, Kewpie corporation, Tokyo, Japan).

End point

The primary efficacy end-point

The change from baseline in Incretin secretion and postprandial metabolic parameters after loading test meal at week 12.

Secondary end-points

The change from baseline in glucose and lipid metabolism. Delta GLP-1 was defined as the difference between peak and baseline. Area under the curve was calculated using the trapezoidal rule and expressed per minute.

Flow diagram

Baseline characteristics and changes in the characteristics of subjects between baseline and 12 weeks

	Voglibose (n=15)		P*	Acarbose (n=15)		P*	P**
	Baseline	12 weeks		Baseline	12 weeks		
Male/female	10:5			13:2			
Body Mass Index	23.7±3.8	23.4±3.9	NS	27.3±3.6	27.2±3.9	NS	NS
AST	22.0±12.3	21.7±8.8	NS	20.6±4.8	21.3±5.5	NS	NS
ALT	26.8±22.4	28.5±15.0	NS	25.4±13.3	28.5±15.0	NS	NS
γ -GTP	29.5±7.8	27.7±11.9	NS	21.5±2.1	15.0±5.1	NS	NS
T-Cho	186.6±27.1	194.7±29.1	NS	199.8±30.3	206.3±44.5	NS	NS
HDL-C	52.5±9.8	52.7±11.6	NS	43.4±6.3	43.0±6.7	NS	NS
LDL-C	113.5±26.0	118.7±26.0	NS	125.3±27.5	136.5±39.1	NS	NS
TG	105.8±54.7	116.7±63.9	NS	131.7±47.4	103.3±39.4	0.02	NS
FPG	121.9±22.4	118.5±12.9	NS	117.0±11.7	119.2±21.1	NS	NS
HbA1c (NGSP)	6.4±0.6	6.3±0.5	NS	6.1±0.5	6.1±0.6	NS	NS

Results of meal tolerance test

Conclusion

- The treatment of T2DM with voglibose resulted in a greater increase in active GLP-1 levels during the meal tolerance test than with acarbose
- Acarbose significantly reduced the postprandial TG and RLP-C levels.
- Voglibose enhances GLP-1 secretion, whereas acarbose improves postprandial dyslipidemia in patients with T2DM.

In conclusion, voglibose enhances GLP-1 secretion, whereas acarbose improves postprandial dyslipidemia in patients with T2DM.