

ABSTRACT

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Comparative Efficacy and Safety of Technosphere® Insulin and a Rapid-Acting Analog Both Given with Glargine in Subjects with T1 DM in a 52-Week Study

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Background and aims: Technosphere® Insulin (TI) is a rapid-acting inhaled insulin with pharmacokinetics well suited for control of postprandial plasma glucose (PPG). This study compared the efficacy and safety of TI and a rapid-acting analog (RAA) both given at meals with insulin glargine, a long-acting analog (LAA).

Material and methods: Subjects with type 1 diabetes mellitus and HbA1c > 7.0% and ≤ 11.0% were randomized to a 52-week course of basal LAA plus prandial TI (n = 301) or prandial RAA (n = 288). Prespecified efficacy endpoints included change in HbA1c, 1-h PPG, 2-h PPG, and fasting plasma glucose (FPG) following a standard meal challenge. Adverse events were monitored to compare safety profiles.

Results: At the end of the 52-week treatment period, both groups experienced comparable reductions in HbA1c, and there were no significant differences in LAA doses between treatment groups. FPG levels and 1-h PPG values were significantly lower with TI than with RAA, and 2-h PPG levels were similar between both groups. The TI group had weight loss, whereas the RAA group gained weight, with the difference statistically significant. Finally, the TI group had a statistically significant reduction in the incidence of mild/moderate (odds ratio [OR]: 0.474; confidence interval [CI]: 0.0271, 0.831; p = 0.0091) and total hypoglycemia (OR: 0.488; CI: 0.278, 0.856; p = 0.0124).

Conclusion: Compared with RAA in subjects with type 1 diabetes mellitus, TI in combination with LAA resulted in comparable HbA1c reductions; more favorable 1-h PPG and FPG; significantly less weight gain; and significantly less risk of hypoglycemia.

End of Study Efficacy (ITT) and Safety Endpoints			
Parameter	TI + LAI	RAA + LAI	p Value or 95% CI
ΔHbA1c from Baseline (%)	-0.13 ± 0.06	-0.37 ± 0.06	0.08, 0.40 (ANCOVA)
ΔFPG from Baseline (mmol/L)	-2.0 ± 0.2	-1.1 ± 0.2	p = 0.0012 (MMRM)
Δ1-h PPG from Time 0 (mmol/L)	1.2 ± 0.3	2.3 ± 0.3	0.0022 (ANCOVA)
ΔWeight from Baseline (kg)	-0.5 ± 0.3	+1.4 ± 0.3	p < 0.0001 (ANCOVA)
Total hypoglycemia (%)	86.01	92.65	p = 0.0124 ^a
Mild/moderate hypoglycemia (%)	85.67	92.65	p = 0.0091 ^a
Severe hypoglycemia (%)	32.76	37.50	p = 0.2387 ^a
Hypoglycemia with plasma glucose ≤ 2.7 mmol/L (%)	4.2	4.7	p = 0.0232 ^a

^a Treatment comparison statistics (p values) are from a logistic regression.