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A Short-term Cost-effectiveness Analysis of Insulin Degludec/Insulin Aspart Versus Insulin Glargine U100 and Insulin Aspart In Patients With Type 2 Diabetes Inadequately Controlled On Basal Insulin

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Background

- In 2018, China pursued a new centralized medicine procurement policy named the national volume-based procurement (NVBP), which aims to lower medicine prices through competitive bidding, bulk purchasing, and reduced transaction costs. The sixth batch of NVBP was specifically for insulin procurement and carried out in September 2021.
- The purpose of this study is to evaluate the long-term cost effectiveness of insulin degludec/insulin aspart(IDegAsp) versus insulin glargine(IGlar) U300 for the treatment of patients with type 2 diabetes (T2DM) after volume-based procurement of insulin in China.

Methods

Based on a published and validated short-term model[1] (Degludec Aspart Cohort Cost-Effectiveness Model,DACE Model) developed in Microsoft Excel, the costs and effects of treatment with IDegAsp versus IGlar U100 + IAsp were calculated over 2-year period, from the Chinese healthcare perspective.

- The clinical data required for the model were obtained from a randomized, controlled phase III trial (NCT02906917)[2], and adjusted to the average level of the Chinese population through literature data.
- China-specific drug costs were calculated based on national negotiation price and volume-based procurement price. Hypoglycemic costs and event-related disutility data were derived from published literature. All costs were adjusted to the price level of 2021 with Chinese Consumer Price Index.
- An annual discount rate of 5% was used for both costs and health outcomes. One-way and probabilistic sensitivity analyses were conducted to access the robustness of results.

Results

Compared with the IGlar + IAsp, treatment with IDegAsp was associated with an improvement of 0.0288 (1.4617 vs 1.4329) quality-adjusted life years (QALYs) over a 2-year time horizon, and saved 5,304 (22,537 vs 27,841)CNY for total cost.

- Results were robust across a range of sensitivity analyses(Table1, Figure 1) .

Table 1. Results of Sensitivity Analysis

Parameter	QALYs			Total cost (¥)			ICER
	IDegAsp	IGlar U100 + IAsp	Difference	IDegAsp	IGlar U100 + IAsp	Difference	
0% discount rate	1.4972	1.4677	0.0295	23,146	28,580	-5,434	Dominant
3% discount rate	1.4755	1.4464	0.0291	22,774	28,128	-5,354	Dominant
8% discount rate	1.442	1.4137	0.0283	22,199	27,431	-5,232	Dominant
5 years	3.394	3.324	0.0700	55,712	68,070	-12,358	Dominant
hypoglycemia	1.4877	1.4663	0.0214	21,796	26,900	-5,104	Dominant
insulin dose	1.4617	1.4329	0.0288	15,892	22,527	-6,635	Dominant
cost	1.4617	1.4329	0.0288	13,097	10,904	2,193	76,272

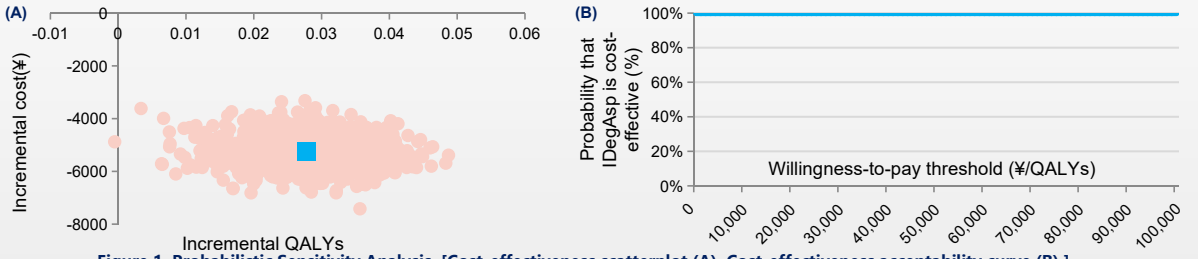

Figure 1. Probabilistic Sensitivity Analysis. [Cost-effectiveness scatterplot (A). Cost-effectiveness acceptability curve (B).]

Conclusions

Compared with IGlar + IAsp, IDegAsp resulted in a gain of QALYs and savings in costs, and was a dominant treatment option for people with T2DM with inadequate glycaemic control on basal insulin in China.

References

[1] Evans M, M Wolden, J Gundgaard, et al. Cost-effectiveness of insulin degludec compared with insulin glargine for patients with type 2 diabetes treated with basal insulin - from the UK health care cost perspective.[J]. Diabetes, obesity & metabolism, 2014, 16(4):366-375.

[2] Philis-Tsimikas A, Astamirova K, Gupta Y, et al. Similar glycaemic control with less nocturnal hypoglycaemia in a 38-week trial comparing the IDegAsp co-formulation with insulin glargine U100 and insulin aspart in basal insulin-treated subjects with type 2 diabetes mellitus[J]. Diabetes Research and Clinical Practice, 2019,147:157-165.

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