COMPARATIVE PHARMACOECONOMIC ASSESSMENT OF THE TYPE 2 DIABETES TREATMENT WITH INSULIN DEGLUDEC AND INSULIN GLARGINE IN BASAL-BOLUS INSULIN THERAPY.

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Introduction and Aim

Type 2 diabetes (T2D) and its complications are among the major causes of long-term disability, premature mortality and significant performance loss. Poor glycemic control, diabetes related complications and insulin usage are the main reasons for significant increase of diabetes costs and health expenditures. In situations of insufficient health care funding high cost of insulin analogues restricts their usage in the routine clinical practice and cuts the possibility to reimburse their cost in some countries. Comprehensive clinical and economic assessments of diabetes treatment strategies with usage of different insulin analogues are the important and useful tool that might help policy-makers to set priorities in decision-making in medicines supply within the existing system of healthcare funding.

The aim was comparative clinical and economic evaluation of basal-bolus regimens with insulin degludec (100 U/ml) and insulin glargine (100 U/ml) in the treatment of T2D.

Materials and Methods

Economic evaluation was performed by means of the cost effectiveness analysis (CEA) with calculation of the cost-effectiveness ratio (CER) and incremental cost-effectiveness ratio (ICER = (Cost1-Cost2)/(Eff1-Eff2), where 1 and 2 - compare medications), cost effectiveness modelling (simulations were performed using 5-year time horizon) with sensitivity analysis, and economic feasibility assessment. The clinical effectiveness was estimated by changes in HbA1c level, frequency of severe hypoglycemia and number of patient-years without complications. Change in HbA1c was analyzed using the data from the clinical practice study. Only the direct medical costs for diabetes treatment (the cost of insulin therapy, treatment of severe hypoglycemia and diabetes related complications) were taken into account.

Results

For 5-year time horizon, the estimated average total direct medical costs of T2D were 783789 RUR per patient with insulin degludec (the cost of insulin therapy accounted for 68%) and 730805 RUR per patient with insulin glargine (with accounting for 62.58% of these costs for the treatment of the severe hypoglycemia and diabetes related complications). Meanwhile, insulin degludec has a higher effectiveness with an additional reduction of HbA1c level by 0.52% (Evans M., 2015), reduces of the rate of severe hypoglycemia and increases the number of patient-years without complications. ICER using insulin degludec was 101236 RUR per patient (based on changing of HbA1c level) and 353224 RUR per patient (for the number of patient-years without complications) (Table 1); it is 14.3 and 4.1 times below the willingness-to-pay threshold respectively. An additional cost analysis showed, that in case when patients have the rates of severe hypoglycemia 3 events/patient/year and >3 events/patient/year, the estimated average total costs with insulin degludec were less by 5% and 23% respectively than using insulin glargine (Figure 1).

Conclusions

Results of clinical and economic analysis demonstrate the clinical and costs benefits of insulin degludec usage in patients with T2D. In subjects with frequency of hypoglycemia ≥3 events/patient/year degludec in basal-bolus therapy is more preferable strategy in T2DM, than insulin glargine. It can be justification for the broader usage of degludec in routine clinical practice to achieve the best glycemic control in T2D patients with minimal adverse outcomes.

Table 1. The estimated incremental cost-effectiveness ratio (ICER) for basal-bolus regimens using degludec and glargine (for 5-year time horizon)

Therapeutic strategy	Direct medical costs, RUR	Incremental costs, RUR	Changes HbA1c, %	Incremental effectiveness	ICER	Number of patient-years without complications	Incremental effectiveness	ICER
Degludec + Aspart	783789	52 984	-1.73	-0.52	101236.27	2.88	0.15	353224.47
Glargine + Aspart	730805	-	-1.21	-	-	2.73	-	-

Figure 1. Modeling the relationship between frequency of severe hypoglycemia and direct medical costs in basal-bolus insulin therapy with degludec and glargine in T2D.
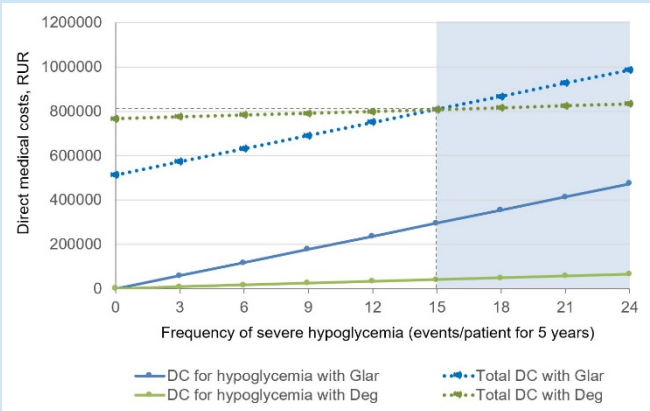
DC – direct costs; Glar – glargine; Deg - Degludec

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