Predicted rates of hypoglycemia with Gla-300 versus first-and second-generation basal insulin analogs: the real-world LIGHTNING study

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Video Abstract

Keywords: Diabetes Therapy, Sanofi, basal insulin, insulin degludec, insulin detemir, insulin glargine, machine learning, predictive modeling, real-world evidence, type 2 diabetes, LIGHTNING study, electronic health records, propensity score matching, insulin analog, glycemic control, hypoglycemia, blood glucose, natural language processing (NLP), randomized control trial (RCT), confounder, Adis

Posted Date: October 4th, 2019

DOI: https://doi.org/10.21203/rs.2.15604/v2

Abstract

Hypoglycemia, or low blood glucose, is an important risk factor for people with type 2 diabetes receiving blood glucose-lowering therapies, such as insulin. It can lead to symptoms that interfere with activities of daily living and can sometimes (though rarely) result in debilitating events, including loss of consciousness. Basal insulins are designed to help maintain stable blood glucose levels throughout the day. Data from randomized clinical trials show that newer, second-generation basal insulin analogs (such as insulin glargine 300 units per mL and insulin degludec) have lower hypoglycemia risk than first-generation basal insulin analogs (such as insulin glargine 100 units per mL and insulin detemir), while providing comparable glycemic control. However, these randomized controlled trials may not truly reflect clinical practice, as they applied strict inclusion and exclusion criteria and were conducted under strict oversight dictated by very specific protocols. Real-world studies look at what happens in day-to-day clinical practice. The LIGHTNING study analyzed real-life data from electronic health records to predict rates of severe hypoglycemia for different basal insulins in adults with type 2 diabetes. The researchers accounted for confounders in this loosely structured dataset by performing two different analyses: propensity score matching, which compares cohorts matched according to clinical characteristics, and a more advanced predictive-modeling approach based on machine learning, which is detailed in an accompanying article. Predictive-modeling results suggest that, among first-time insulin users, glargine 300 would lead to 50% lower rates of severe hypoglycemia compared with the first-generation basal insulin analogs: 1 event every 14 years versus 1 every 7 years. Meanwhile, compared with those switching to insulin detemir from another basal insulin analog, patients switching to glargine 300 could expect 30% lower rates of severe hypoglycemia: 1 event every 5 years instead of 1 every 3 years. Similar rates of severe hypoglycemia were predicted for both second-generation basal insulins, glargine 300 and degludec, regardless of whether patients had previously used basal insulin. These predictive-modeling findings agree with the propensity score matching results and are also generally consistent with those of randomized controlled trials and other real-world studies. More work is needed to explore the predicted effects, as the models used simplify the complex factors that determine the real-life risk of hypoglycemia. But these results, based on real data from patients in clinical practice, are encouraging and could help patients and healthcare providers make more informed decisions about basal insulin treatment options for people with type 2 diabetes.