

DSEN ABSTRACT

Comparative Efficacy and Safety of Ultra-Long-, Long-, and Intermediate-Acting and Biosimilar Insulins for Type 1 Diabetes: A Systematic Review and Network Meta-Analysis

Summary

- We conducted a systematic review to assess the comparative effectiveness and safety of intermediate-, long-, and ultra-long acting insulin products, including biosimilars, in patients with type 1 diabetes mellitus (T1DM). Identifying 65 eligible studies, evidence suggested that both ultra-long-acting and long-acting insulin were superior to intermediate-acting insulin in reducing A1c, FPG, weight gain, and the incidence of major, serious, or nocturnal hypoglycemia.

Key messages

- Our review provide valuable insights for patients, healthcare providers, and policy-makers to optimize their insulin treatment choice based on the desired outcomes.
- Policy-makers must activate policies supporting access to insulin treatments by making them accessible and affordable.

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What is the issue?

- Type 1 diabetes mellitus (T1DM) is an autoimmune disease that destroys beta cells in the endocrine pancreas, causing absolute insulin deficiency and hyperglycemia, which is linked to significant morbidity and mortality.
- Managing T1DM involves insulin therapy to mitigate complications. Biosimilar insulins, with comparable structures to reference insulins, also provide similar clinical functions. However, evidence regarding their safety and effectiveness versus reference insulins in patients with T1DM remains limited.

What was the aim of the study?

- The purpose of this current project is to update our prior systematic review to evaluate the comparative effectiveness and safety of long- or intermediate-acting insulin versus biosimilar insulins in patients with T1DM.

How was the study conducted?

- We used the guidance from the Preferred Reporting Items for Systematic Review and Meta-analysis Protocols (PRISMA-P) statement and the Cochrane Handbook to conduct the review. We registered the protocol on PROSPERO and report the results according to the PRISMA-Network Meta-Analysis extension and the International Society for Pharmacoeconomics and Outcomes Research (ISPOR-NMA) tool.
- We searched MEDLINE, EMBASE, and Cochrane Central Register of Controlled Trials from inception to March 27, 2019.
- Eligible studies included patients ≥ 16 years with T1DM using insulin, insulin analogues, and biosimilar insulins. Experimental (randomized controlled trials [RCTs], non-randomized controlled trials, quasi-randomized trials), quasi-experimental (interrupted time series, controlled before and after studies), and cohort studies.
- We evaluated study quality using the Cochrane Risk of Bias (ROB) tool, the Cochrane Effective Practice and Organization of Care (EPoC) tool, and the Newcastle-Ottawa Scale. We considered conducting network meta-analyses (NMAs) whenever feasible.

What did the study find?

- After screening 21,346 studies, 65 unique studies were included. Results indicate that both ultra-long-acting and long-acting insulin were superior to intermediate-acting insulin in reducing A1c, FPG, weight gain, and the incidence of major, serious, or nocturnal hypoglycemia.
- Results indicated that long-acting once a day (od) insulin is more effective than long-acting twice a day (bid), and ultra-long-acting od insulin is more effective than long-acting bid for fasting blood glucose. For weight change, long-acting od insulin was less effective than long-acting bid, and long-acting bid insulin was more effective than long-action biosimilar od.

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