ALTERED PATTERNS OF EARLY METABOLIC DECOMPENSATION IN SGLT2I-TREATED T1D AFTER INTERRUPTION OF BASAL INSULIN

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Background

Enthusiasm for the benefits of SGLT2 inhibitors (SGLT2i) as an adjunctive treatments in type 1 diabetes (T1D) has been offset by the possible increased risk of diabetic ketoacidosis (DKA). Since pump-treated T1D patients are susceptible to DKA, due to infusion site problems, this study was undertaken to assess how treatment with SGLT2i affects patterns of early metabolic decompensation following suspension of basal insulin.

Hypothesis

We hypothesized that treatment with an SGLT2i would make insulin-pump treated patients prone to a more rapid increase in B-hydroxybutyrate (BHB) levels should there be an interruption of the basal insulin infusion.

Participants

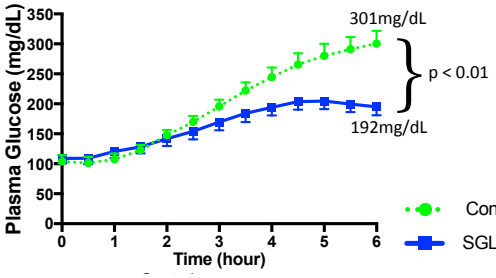
- Mean age = 23 ± 5 years (range 19-35)
- Male = 2 / Female = 8 (N = 10)
- Mean A1c = 7.4 ± 0.8 % (57.0 ± 8.7mmol/mol)
- Mean Duration of T1D = 10 ± 8 years (range 2-31)

Methods

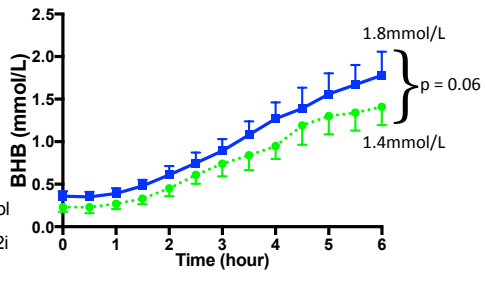
- Participants were admitted overnight to an inpatient research unit on 2 separate occasions: insulin pump therapy alone (control) vs. insulin pump therapy with SGLT2i (Canagliflozin)
- After the control study, Canagliflozin was started at 100mg once daily and titrated to 300mg once daily after ~1 week
- During inpatient admissions, participants remained on their usual basal rates and boluses (carb coverage and corrections, as needed) were administered via the pump pre-dinner and at 10p.m.
- Basal insulin was suspended at 3:00am, only if:
  - Plasma glucose <150mg/dL, AND
  - BHB by Precision Xtra meter <0.6mmol/L
- Plasma glucose (PG) and BHB levels were measured every 30 minutes
- Insulin interruption phase of the study was terminated after 6 hours, or earlier if bedside BHB ≥2.5mmol or PG >350mg/dL

Results

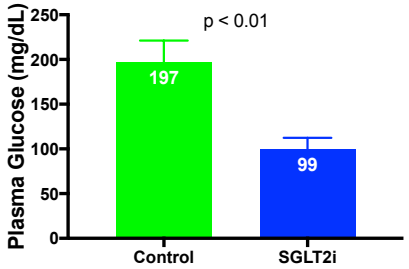
A. Plasma Glucose Profile



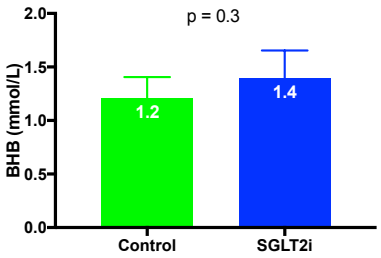
B. Beta-hydroxybutyrate Profile



C. Incremental Rise in Plasma Glucose



D. Incremental Rise in BHB



Conclusions

In insulin-pump treated T1D patients receiving SGLT2i, difficulty recognizing early DKA following interruption of basal insulin is primarily due to the more gradual increase in PG rather than to more rapid increases in BHB.

Implications

T1D patients using SGLT2i should test for ketones based on symptoms of illness rather than relying on persistent elevations of glucose to identify impending DKA.

Acknowledgements

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