Association between Fructosamine, independent of HbA1c and intermittently scanned continuous glucose monitoring metrics: A single-centre study from the Middle East

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Background and Aims: Fructosamine can estimate glycaemic status where HbA1c measurement is potentially inaccurate. We investigated relationships between fructosamine, HbA1c and FreeStyle Libre-estimated Glucose management indicator (GMI) in a population with high prevalence of undiagnosed variant haemoglobin.

Methods: Persons with type 1 (T1DM) or type 2 (T2DM) diabetes on FreeStyle Libre whose sensor was active >50% of the time were included. Ambulatory glucose profile data from 30 days prior to fructosamine measurement were collected from LibreView. In these selected patients where there was a clinical decision to use fructosamine to assess glycaemic control, fructosamine (Cobas c501) was not significantly associated with simultaneously-measured HbA1c (Variant) ($p = 0.16$).

Results: Twenty-three [9 (39%)females, median age 36.6 (28.3-53.9) years, 12 T1DM, days worn 28.0 (23.5-29.5), sensor coverage 85% (71.0-97.0%)] patients were included. Median (IQR) fructosamine and HbA1c were 348 (296-391) umol/L, 7.2% (5.2-8.7)% respectively. Fructosamine was positively associated with GMI adjusted for diabetes type and HbA1c (Fructosamine 0.020 ± 0.004, $p < 0.0001$), T2DM 1.378 ± 0.517, $p < 0.015$, HbA1c n.s.) and negatively associated with both hypoglcyaemic events (glucose <70 mg/dL) per day (Fructosamine -0.004 ± 0.002 $p = 0.016$, T2DM -0.950 ± 0.634, $p < 0.001$, HbA1c n.s.) and time in range 70-180 mg/dL (-0.296 ± 0.063, $p < 0.001$, HbA1c n.s.). Adjusting for diabetes type, a fructosamine <300 umol/L was significantly associated with increased hypo frequency (0.59 ± 0.17, $p = 0.003$).

Conclusions: In this selected population, fructosamine was a significant and independent predictor of objectively-measured TIR and hypo frequency while HbA1c was not.