Introduction

- Diabetes Mellitus is a widespread problem, increasing at alarming rates and is associated with increased morbidity and mortality
- HbA1C is an accepted as a reliable tool for the diagnosis of DM, and help monitor glycemic control
- However, in some clinical cases, A1C can be an inaccurate representation of control
- Several alternative methods have been proposed, including Fructosamine, Glycated Albumin, and continuous glucose monitoring to evaluate recent glycemic control
- We present a case of a patient with Sickle Cell Anemia who had a severe discrepancy between HbA1C and Fructosamine Assay.

Fructosamine test

- Fructosamine, is a ketoamine, formed by reaction between glucose and amino group of proteins, including Albumin, Globulins, and lipoproteins
- Glycated Albumin, (GA) is the result of non-enzymatic glycation of albumin with higher blood glucose levels being associated with higher glycated albumin levels.
- Since serum proteins have a much lower half life, 14 days, measurement of fructosamine provides overview of blood glucose control within the previous 2-3 weeks
- Fasting specimen are not required
- Assays are widely available, and fairly inexpensive
- Reference range of fructosamine test is 200-285
- Glycated albumin – 14% in normal, can be up to 17% or higher in diabetics
- However, there is lack of standardization across assays
- Affected by changes in temperature, presence of substances e.g., Bilirubin, and conditions that influence serum albumin levels (e.g., Cirrhosis, Nephrotic syndrome)
- GA less affected by albumin concentrations as expressed as a percentage of total albumin
- Fructosamine unreliable when serum Albumin < 3.0 g/dl
- Can be affected by condition that raise serum protein e.g., MM

Discussion

- HbA1C , a key tool in diagnosis and monitoring Diabetes Mellitus, can often underestimate blood glucose control in patients with sickle cell disease, other RBC Disorders and Renal Disease.
- Fructosamine assay may be used as a short-term marker to assess glycemic control and prediction of both microvascular and macrovascular complications
- Can have additional utility in monitoring people with fluctuating or poorly controlled diabetes, monitoring control in diabetes, as well as monitor recent medication change.
- Although conversion formulas have been developed to approximate A1C levels, no definitive guideline exist to correlate fructosamine to blood glucose control or A1C levels.

Conclusion

- We propose greater awareness be made regarding alternative monitoring in such patients at high risk for inaccurate readings
- Additionally, guidelines should be developed to help clinicians interpret these alternative methods for better control of blood sugar levels and to help prevent adverse events of uncontrolled Diabetes.

References