

# Utility of Labile A1c for the Identification of a Hyperglycaemic Episode

R.Ziola, Clinical Biochemistry, Antrim Area Hospital. Northern Health and Social Care Trust

Keywords: Hyperglycaemia, Labile A1c

## Introduction

Haemoglobin comprises several haemoglobin fractions including HbA1c (or glycated haemoglobin) and labile A1c (LA1c), which can be individually separated and quantified using High Pressure Liquid Chromatography (HPLC). HbA1c is used in the diagnosis and monitoring of diabetes owing to the relationship between glycation of haemoglobin over the lifespan of a red blood cell and glycaemic control over time. Glycation of haemoglobin produces LA1c as an unstable intermediary during Hba1c production (1). A short study was conducted to determine if a relationship exists between the level Labile A1c and patient glucose levels at the time of sampling, which would provide a valuable indicator of a hyperglycaemic episode in the absence of a concurrent glucose measurement.

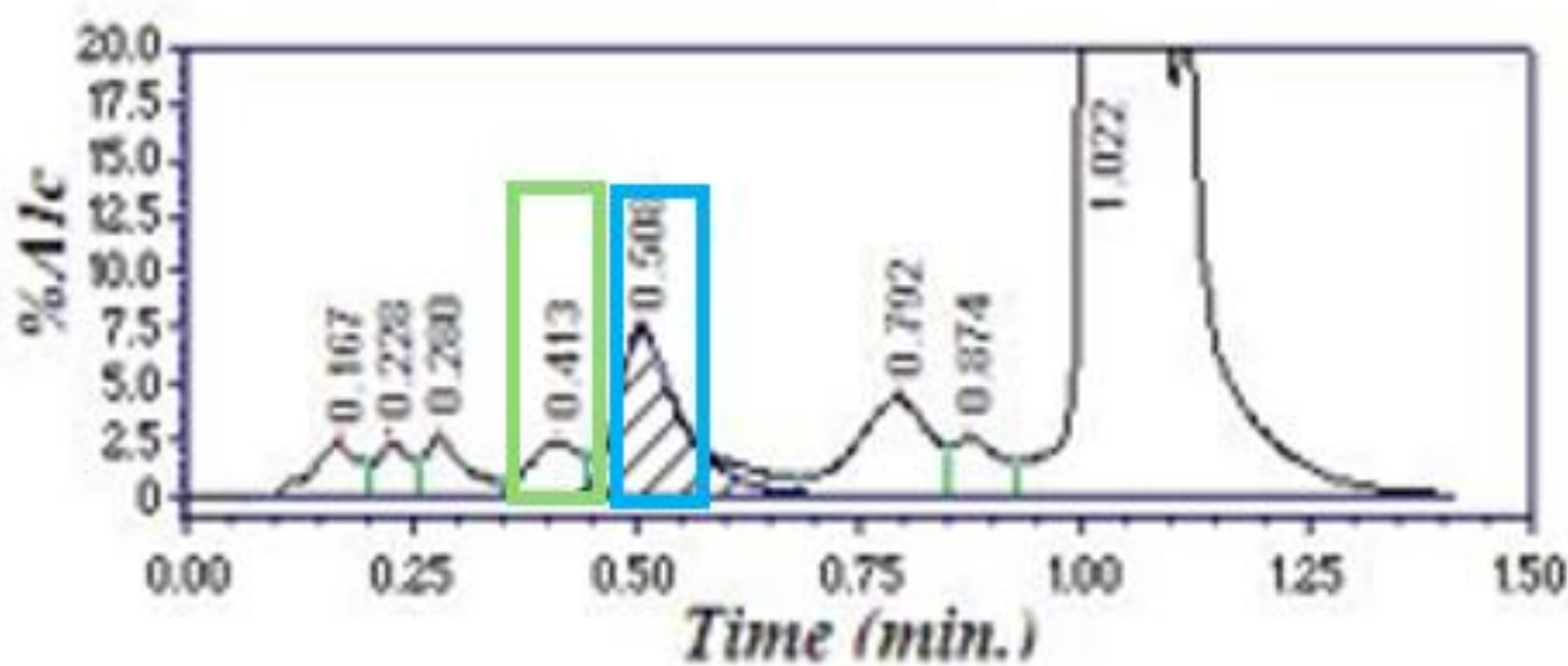


Figure 1 – Chromatogram showing separation of haemoglobin fractions by HPLC. Area in green box indicates Labile A1c. Area in blue box indicates HbA1c

## Method

Samples for HbA1c were processed using cation exchange HPLC (Bio-Rad Variant II). Following separation the chromatograms were reviewed and the LA1c fraction area was then recorded. An accompanying sample, collected concurrently with the HbA1c, was processed for plasma glucose using the Roche c702 photometric module. The glucose result was then recorded.

## Results

The percentage area of LA1c of the samples included within the study range from 1.7% – 6.2% (n=46). Comparison of LA1c area and glucose shows LA1c area of:

Area of Labile A1c Peak (%)	Range of Glucose Results
<2% n= 6	5.2-5.7mmol/L
≥ 2% and <3% n= 8	5.5 – 9.5 mmol/L
≥3% and <4% n= 8	12.3-17.8mmol/L
≥4% and <4.5% n= 17	21-25.2mmol/L
≥4.5% up to 6.2% n= 12	20.6-40.2mmol/L

## Discussion

There is no requirement within current guidance to submit a glucose sample alongside a HbA1c (2). The data collected indicates a strong relationship between Labile A1c and glucose levels at the time of sampling, this provides the laboratory with an indicator of incidents of a hyperglycaemic episode in the absence of a concurrent glucose, information which could be relayed to clinicians. Current laboratory phone out limits recommended by the Royal College of Pathologists at 25 mmol/L (adult) (3). A glucose of 25 mmol/L could be suspected when Labile A1c measured area is > 4.5%.

## Conclusion

Labile A1c provides a valuable opportunity to identify a hyperglycaemic episode with little additional work required by laboratory staff.

### References

1. H. Franklin Bunn *et al.* ,The Glycosylation of Hemoglobin: Relevance to Diabetes Mellitus.*Science*200,21-27(1978).DOI:[10.1126/science.635569](https://doi.org/10.1126/science.635569)
2. National Institute of Health and Care Excellence (NICE), 2022, “Type 2 diabetes in adults: management”.
3. Royal College of Pathologists, 2022, “The communication of critical and unexpected pathology results”