

All Wales Clinical Biochemistry Audit Group

Standards for Monitoring Glycaemic Control in Patients with Diabetes Mellitus

INTRODUCTION

Improved glycaemic control (as shown by HbA1c results) has been shown to be associated with a significant reduction in complication rates in patients with insulin-dependent diabetes mellitus¹ and those with non-insulin-dependent diabetes mellitus treated with insulin,^{2,3} sulphonylureas³ or metformin.⁴

A recent survey of methods for monitoring glycaemic control in use in Wales, presented at an audit meeting in May 1995, showed wide variations in practice. In view of the need for reliable, consistent and comparable methods for monitoring glycaemic control, a more extensive meeting to review this topic and audit practice was held in February 1996. A further re-audit in March 1999 showed that all laboratories in Wales were now using HbA1c as their first-line test for the long-term monitoring of glycaemic control.

STANDARDS

The following standards are recommended in the light of the presentations and discussion at these meetings and subsequent widespread consultation with laboratory and clinical staff in Wales. They are in line with UK recommendations on the standardisation of HbA1c measurements⁵ and have been updated in the light of recent guidance from the National Institute for Clinical Excellence (NICE).⁶

1. Choice of Test

Glycated haemoglobin, preferably its major component HbA1c, is currently recommended as the first-line test for the long-term monitoring of glycaemic control in patients with diabetes mellitus. Fasting plasma glucose is also useful for monitoring control in patients with non-insulin dependent diabetes mellitus, but fructosamine is no longer recommended.

2. Methodology Requirements and Specificity

It is important that:

- a) the labile fraction is not measured (this will influence method choice for clinic analyses);
- b) HbF and abnormal haemoglobins should be identified separately using chromatographic methods and should not cross-react using immunological methods.

3. Precision and Bias

- a) Each laboratory performing HbA1c assays should ensure that appropriate internal quality control and external quality assessment (EQA) procedures are in place.
- b) The maximum acceptable between-batch coefficient of variation for HbA1c should be 5%;⁷ this needs to be maintained on a long-term basis to provide reliable cumulative results.
- c) Ideally, all HbA1c methods should give identical results (i.e. no bias), so that a universally applicable reference range could be used by all laboratories. A universal standard has now been developed, against which "DCCT-equivalent" results have been referenced. However, pending a decision as to whether to report results directly calibrated against this new standard, it is currently recommended that HbA1c assays should be calibrated to give "DCCT-equivalent" results in order to harmonise HbA1c results throughout Wales.^{5,6}

4. **Reporting of Results**

- a) The "normal" non-diabetic reference range should be quoted on reports, but clinicians need to be made aware that this "normal" range is not necessarily the appropriate target for glycaemic control in diabetic patients. The use of age or sex-related reference ranges may be appropriate. For each individual, NICE⁶ recommend that a target HbA1c (DCCT-aligned) should be set between 6.5% and 7.5%, based on the risk of macrovascular and microvascular complications.
- b) The addition of specific written guidance about the significance of HbA1c results with respect to the adequacy of glycaemic control is not encouraged. However, results suggestive of poor glycaemic control should be brought to the attention of non-expert clinicians.
- c) The use of cumulative reports for HbA1c results is encouraged.
- d) The provision of within or pre-clinic results has advantages and is encouraged.

5. **Frequency of Measurements**

HbA1c should be measured at least 6 monthly for every diabetic individual, but more frequently (up to 2 monthly) if glycaemic control is suboptimal.⁶ Measurements more often than every 2 months should generally be discouraged, except in specific situations such as the monitoring of diabetic pregnancy.

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