Standardization of the hemoglobin A\textsubscript{1c} reporting: transferring global consensus to the local community - Special report

Marijana Vučić Lovrenčić \textsuperscript{1*}, Željko Metelko\textsuperscript{2}

\textsuperscript{1}Institute of Clinical Chemistry and Laboratory Medicine, Merkur Clinical Hospital, Zagreb, Croatia
\textsuperscript{2}Vuk Vrhopac University Clinic, Merkur Clinical Hospital, Zagreb, Croatia

\textsuperscript{*}Corresponding author: vucic@idb.hr

Received: November 11, 2010  Accepted: December 8, 2010

This Special report is being simultaneosuly published in 2010/2011 in Biochemia Medica, Diabetologia Croatica and croatian-translated version in Liječnički vjesnik. Copying with attribution allowed for only non-commercial use of work.

Long-term controversies regarding hemoglobin A\textsubscript{1c} (HbA\textsubscript{1c}) standardization seem to have finally reached the global consensus point. Hemoglobin A\textsubscript{1c}, an integrated measure of glycaemic control, has been widely used as a „gold-standard“ in management of diabetes mellitus for decades (1). However, the standardization of the „gold-standard“ has been very difficult to achieve, due to so far unprecedented conflict between analytical and clinical standardization concept.

Ever since the results of the Diabetes Control and Complication Trial (DCCT) showed positive relationship between the degree of glycaemic control (assessed as hemoglobin A\textsubscript{1c}) and risk for development of diabetic complications, the goal for successful diabetes treatment has been anchored to the hemoglobin A\textsubscript{1c} level <7\% (2). However, the 7\% cut-off has been derived from DCCT data by using highly reproducible, but non-specific HPLC method for hemoglobin A\textsubscript{1c} measurement. Based on the „DCCT-method“, the National Glycohemoglobin Standardization Programme (NGSP) has been designed to harmonize results from all the methods to the DCCT-traceable results. Thus, a clinical harmonization has been achieved and all the results obtained by the NGSP-traceable methods could easily be compared to the globally accepted clinical goals for glycaemic control (3).

In the meantime, International Federation of Clinical Chemistry (IFCC) developed primary reference standard and reference method, which has been accepted as the only valid anchor to calibrate hemoglobin A\textsubscript{1c} methods worldwide (4). However, due to its specificity, IFCC reference method managed to produce significantly lower hemoglobin A\textsubscript{1c} results than DCCT-HPLC method (5). This was found to be unacceptably confusing for the medical diabetology community, mostly because of the evidence that lowering the hemoglobin A\textsubscript{1c} range and, consequently, glycaemic goals, could have psychological impact to the patients and lead to the worsening of glycaemic control (6).

In order to overcome this problem, IFCC proposed to switch reporting units from conventional (\%) to the SI units (mmol/mol) (6), which finally resulted into „2010 Consensus Statement on the Worldwide Standardization of the Hemoglobin A\textsubscript{1c} Measurement“ (7). The consensus was agreed between American Diabetes Association (ADA), European Association for the Study of Diabetes (EASD), International Diabetes Federation (IDF), IFCC and International Society for the Pediatric and Adolescent Diabetes (ISPAD) during the IDF-World Diabetes Congress in Montreal, Canada, October 2009.
Consensus statement implicates global standardization of hemoglobin A\(_{1c}\) according to the IFCC reference system, and proposes dual system of hemoglobin A\(_{1c}\) reporting by clinical laboratories worldwide: SI (mmol/mol, no decimals) and conventional (%; NGSP-derived, one decimal). Conversion between units should be done by using IFCC-NGSP master-equation, and conversion tables should be available to the medical and lay parts of diabetic community. The reportable term is HbA\(_{1c}\). As regards publishing, there is a strong recommendation to the editors of medical journals to require dual system of reporting in all manuscripts reporting HbA\(_{1c}\) results.

The consensus should be implemented as soon as possible worldwide, with concerted efforts of laboratory and medical professionals in transferring all necessary information within the diabetes community. Further steps in global standardization of hemoglobin A\(_{1c}\) shall be proposed on the next consensus meeting, at the IDF World Diabetes Congres in Dubai, December 2011.

The implementation of the global consensus in Croatia is planned as a 4-step process:

1. Croatian Chamber of Medical Biochemists has announced on its web-pages activities regarding consensus implementation, together with translated consensus summary (October 2010).

2. Croatian Society of Medical Biochemistry, as the national EQA-organizer, has prepared necessary modifications in the HbA\(_{1c}\) part of the scheme, which shall be executed with the 3rd annual EQA-cycle in November 2010. Briefly, all the participants shall be asked to provide results expressed in dual reporting system, and make all the necessary arrangements for the routine consensus implementation (December 2010). It should be mentioned that consensus implementation requires only a mathematical operation, and no additional expenses to the HbA\(_{1c}\) testing are to be expected. Reagent manufacturers have already prepared all the necessary NGSP-conversion formula details.

3. Dual reporting of HbA\(_{1c}\) results from all laboratories in Croatia should be operative as from January 1\(^{st}\) 2011. Croatian Chambers of Medical Biochemists shall prepare a letter of information, addressed to all relevant partners in the diabetes community (January 2011).

4. A special report covering this issue will be published in relevant scientific journals: Biochimia Medica, Diabetologia Croatica, and translated version in Liječnički vjesnik.

We hope that this process will ensure necessary conditions for successful implementation of the global consensus to the Croatian medical and laboratory community involved in diabetes care.

Considering rising prevalence of diabetes mellitus in Croatia (8), compliance to the global consensus not only provides harmonization of hemoglobin A\(_{1c}\) reporting, but also assures the continuity of implementation of the highest standards of medical care for diabetic patients in Croatia.

References


Biochimia Medica 2011;21(1):53-4