JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH

How to cite this article:
Shah V. HbA1C: what is its place in the Indian Scenario?.Journal of Clinical and Diagnostic Research [serial online] 2010 August [cited: 2010 August 31]; 4:3006-3009.

Available from
http://www.jcdr.net/back_issues.asp?issn=0973-709x&year=2010 &month= August &volume=4&issue=4&page=3006-3009 &id=1016

LETTER TO EDITOR

HbA1C: What is its place in the Indian Scenario?

Shah V

Dr. Viral Shah
Senior Resident,
Department of Endocrinology,
Postgraduate Institute of Medical Education and Research,
Chandigarh.
Email: viralshah_rational@yahoo.co.in
Phone: 09872308785

Traditionally, the diagnosis of diabetes is based on plasma glucose value, either during fasting or 2-hrs after 75 gms of anhydrous glucose administration.Thanks to Samuel Rahbar 1who brought glycated haemoglobin (HbA1c) into the light in1960. Further work by the same authors showed that HbA1c increases in patients with diabetes. It was the first work done by Koenig RJ and coworkers2 which highlighted the role of HbA1c in correlating the glucose values in 1976. After the robust data form DCCT and UKPDS, HbA1c has become an integral part of monitoring the glycaemic control in diabetes and ADA came with the recommendation of the goal of HbA1c of less than 7 to manage diabetic patients.

Despite the widespread use of HbA1c in monitoring diabetic patients, until now, it did not take the center stage in diagnosing diabetes in non pregnant adults and this fact was clearly depicted in the ADA 2009 position statement. The only reason given by ADA was lack of standardization for HbA1c.

This statement was revised within a short span of a year by ADA and it published new guidelines to define diabetes in non-pregnant persons. This time, HbA1c was given prime importance 3. The rationale for including HbA1c for the diagnosis of diabetes were, in brief: 1) good correlation with HbA1c and the development of retinopathy 2) HbA1c assays are now highly standardized and their results can be uniformly applied 3) advantages of HbA1c over FPG like; it can be done at any time of the day, greater preanalytical stability and of course, lesser day to day variation.

This is the description of HbA1c in short. Now, the questions which can arise in our mind are: 1) Should we accept the ADA 2010 guidelines as they are? 2) Do we have data regarding the standardization of HbA1c for India? 3) Is it cost-effective to accept HbA1c for diagnosing diabetes? These questions were among the few which arose.

Experts took a long time to accept the role of HbA1c in the diagnosis of diabetes, as they were worried about the standardization of an assay. This simply signifies how important the assay, its technique and its standardization are! We cannot rely on an assay which is not standardized. Thanks to the efforts by ADA and the American Association of Clinical Chemists (AACC) in establishing the National Glycohaemoglobin Standardisation Programme (NGSP) in 1996. As a result of these, more than 90% of the US laboratories have now standardized the HbA1c assay. We don't have any data on the standardization of HbA1c in India. Therefore, this is the first caution about its use.

Despite the inclusion of HbA1c as an assay for defining diabetes, the American Association of Clinical Endocrinologists (AACE) has still not supported its use for the diagnosis of diabetes, though they mentioned HbA1c as an optional investigation. The reasons cited by Dr. Bloomgarden were; 1) There are difficulties in equating HbA1c with true glycaemia. 2) There were published literature that HbA1c may be a particularly poor choice in determining whether a given individual does or does not have diabetes 3) Interindividual variability between high glycators and slow glycators 4) Many

cases may be underdiagnosed by using the current cut off defined by ADA and many more 4.

Furthermore, a few added problems of HbA1c mandates caution for recommending HbA1c for the diagnosis of diabetes. The reasons are as follows;

1) The drawback of HbA1c as mentioned by Bloomgarden, needs to be agreed about.

2) We do not have data on how many laboratories in India are standardized for the HbA1c assay. Until and unless, we do not have a standardized assay we cannot rely on it.

3) We should understand the fallacies of the HbA1c test like; it may not be accurate in certain situations like haemoglobinopathies, situations which increase RBC turn over, severe anaemia, etc. Many parts of India have a very high incidence of thalassaemia and other haemoglobinopathies. Therefore, the application of HbA1c may not be reliable for these geographical areas.

4) The recent article in Diabetes care showed that Iron deficiency anaemia (IDA) is associated with a shift of HbA1c from less than 5.5 % to more than 5.5%, with odds of 1.39. 5 IDA is very common in India and numerous studies have revealed its prevalence rate to be as high as 40-60% among females. This makes HbA1c a very poor choice for Indian diabetics.

5) HbA1c is again a poor test in patients with chronic kidney disease. Diabetes is the most common cause of end stage renal disease. This again makes HbA1c a poor test among these subgroups of patients.

6) There are even some variations in HbA1c among different ethnic populations. We do not have data on whether Indians are high glycators or low glycators.

7) It was precisely pointed out by Sarosh Ahmed Khan that many conditions that can lead to falsely elevated HbA1C values included alcoholism, lead poisoning, opiate addiction, excessive use of salicylate and pregnancy 6. One study found that HbA1c is higher among smokers 7. Therefore, a number of these situations make HbA1c a poor tool for diagnosing diabetes.

8) Cost is also an issue which has to be taken into account, as HbA1c is costlier than FPG to diagnose diabetes. We don't have any data on the cost effectiveness of HbA1c for diagnosing diabetes in the Indian setup.

Considering all these points, there is still time for HbA1c to get the nod in being used for the diagnosis of diabetes.

However, this does not prove that HbA1c is a poor test. It is very good test to monitor diabetic patients and numerous evidences correlated HbA1c and the development of complications in diabetes. Therefore, in institutions with a standardized assay, HbA1c can still be recommended in selected patients and situations to make a diagnosis of diabetes. We should generate more data for 1) the correlation between FPG, PPG and HbA1c in Indian patients and their correlation with complications/outcome 2) use of a standardized assay in Indian laboratories 3) cost-effectiveness of HbA1c in comparison to the traditional approach. If we can be able to conduct studies to answer the above problems, I think that HbA1c can be the gold standard test for the diagnosis of diabetes.

References

[1] Rahbar S. The discovery of glycated hemoglobin: a major event in the study of nonenzymatic chemistry in biological systems. Ann N Y Acad Sci. 2005; 1043:9-19.

[2] Koenig RJ, Peterson CM, Jones RL, Saudek C, Lehrman M, Cerami A. Correlation of glucose regulation and hemoglobin AIc in diabetes mellitus. N Engl J Med. 1976; 295(8):417-20.

[3] ADA: Standards of Medical Care in Diabetes—2010. Diabetes care 2010; 33 (1): S11-13.

[4] Bloomgarden Z T, Einhorn D. Hemoglobin A1c in Diabetes Diagnosis: Time for Caution. Endocrine Practice 2010; 16 (1): 5-6.

[5] Kim C, Herman W H, Bullard K M, Beckles G L. Association between iron deficiency and A1c levels among adults without Diabetes in the national health and Nutrition examination survey, 1999–2006. Diabetes care 2010; 33:780–85.

[6] Khan S A. Why shouldn't we consider HbA1c for the diagnosis of Diabetes mellitus? Physicians Academy 2009; 3(10): 102-3.

[1] Gulliford M C, Ukoumunne O C. Determinants of glycated haemoglobin in the general population: associations with diet, alcohol and cigarette smoking. Eur J Clin Nutr 2001; 55(7): 615-23.