Biomedical Research 2010; 21 (3): 252-256

Alternative markers of glycemic status in diabetes mellitus

Anupama Hegde, Ramya Shenoy1, Prajwal D’Mello, Smitha A, Tintu A, Poornima Manjrekar

Department of Biochemistry, Kasturba Medical College, Manipal University, Mangalore-575004, Karnataka, India
1Department of Community Dentistry, Manipal College of Dental Sciences, Manipal University, Mangalore-575001, Karnataka, India.

Key Words: Fasting Plasma Glucose, Diabetes, MDA, TOA, Saliva, Salivary glucose, Salivary pH

Accepted March 15 2010

Abstract

Monitoring people with diabetes by repeatedly estimating blood glucose and glycosylated hemoglobin levels is invasive which becomes appalling and expensive over time. Potential of saliva as a diagnostic tool could be exploited in this regard. 26 diabetes patients were compared with 21 age matched non-diabetic healthy controls for Fasting plasma glucose (FPG), salivary glucose (SG), salivary pH (SpH), Oral health status and markers of oxidative stress in saliva namely Thiobarbituric Acid Reactive substance (TBARS) or Malondialdehyde (MDA) and Total antioxidant activity (AOA). Significantly high FPG (p=0.005) along with high salivary AOA (p < 0.0001) levels, markedly lesser SpH and MDA were found in the diabetic group. Changes in SG levels between the groups were of no consequence. FPG showed positive correlation to SG (r = 0.410) and even better correlation with salivary MDA (r = 0.562) only in diabetes. Since SG levels did not differ between the two groups, the study concludes that conventional marker like FPG is a better indicator of glycemic status. Lower MDA seen in saliva of diabetic group may be probably due to the exceptionally high AOA activity seen in these people.

Introduction

Diabetes mellitus is the commonest endocrine metabolic disorder resulting in hyperglycemia either due to primary insulin deficiency or reduction in its biologic effectiveness or both. Asian Indians seem to be at a greater risk of developing this disorder. Currently we have 40.9 million people suffering from diabetes and the predicted estimate by the year 2025 is around 70 million. The crude prevalence rate of diabetes in urban areas is about 9% and in rural areas, has increased to around 3% of the total population [1].

Long standing diabetes is also associated with poor oral health manifested by xerostomia, periodontitis, gingivitis, etc. Oral problems seen may be related to metabolic control of the disease and poorly controlled glucose levels happen to affect the salivary glands [2,3]. There is evidence suggesting an unbalance between oxidant and antioxidant status associated with diabetes. Mechanisms involved in the increased oxidative stress in diabetes include oxygen derived free radical generation due to non-enzymatic glycosylation (glycation), auto-oxidation of glycation products, and also changes in the tissue content and activity of antioxidant defense systems. Increased levels of the products of oxidative damage to lipids have been detected in serum of diabetic patients, and their presence correlates with the development of complications [4-7]. Free radicals produced as a result of oxidative stress cause chemical modifications and damage proteins, lipids, carbohydrates, nucleic acids in the tissues.

Monitoring people with diabetes involves repeated estimations of Plasma glucose either by finger pricks or by intravenous blood sampling. Hence a non-invasive procedure for glucose measurements would be most welcome under the circumstances.

Considering these facts, this study was designed to estimate glucose levels and markers of oxidative stress in saliva, and determine their relation to fasting plasma glucose levels if any.

Oral consent was obtained from the patients and written consent was obtained from the Medical records department (MRD) to access data from the records.