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Correlation between Plasma and Salivary Glucose Levels on Diabetic Patients Attending Diabetic Center at Teaching Hospital, Jaffna

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Introduction

Diabetes mellitus (DM) is being diagnosed and monitored by invasive, painful procedures causing discomfort to patients. Saliva can be used as an alternative to blood as saliva collection is non-invasive and associated with fewer compliance problems.

Methods

This laboratory-based experimental study consisted of 83 diabetic patients (49 females and 34 males) who attended Diabetic Center, Teaching hospital, Jaffna. Patients with salivary gland surgeries, pregnancy, who chew betel, arecanut and chewing gum were excluded. Fasting venous blood and un-stimulated saliva were collected into fluoride-oxalate and sterile plastic container respectively. Salivary glucose was estimated by an improvised glucose oxidase-peroxidase method. The LOQ for this method is 0.2 mg/dL, however, extensive testing around the lower limit is needed. Precision test was performed to validate the test results. Pearson's correlation coefficient was used to assess the correlation.

Results

Mean (\pm SD) plasma and salivary glucose levels were 139.05mg/dL (\pm 49.62) and 1.02mg/dL (\pm 0.59) respectively. Plasma and salivary glucose were within the range of 57.04 to 251.43 mg/dL and 0.24 to 2.32 mg/dL respectively. Salivary glucose level was significantly increased with the increase of plasma glucose (Pearson's correlation coefficient = 0.694, $p < 0.0001$; $R^2 = 0.43$). Higher degree of correlation was found in females ($r = 0.844$, $p < 0.001$; $R^2 = 0.71$) than males ($r = 0.417$, $p = 0.014$; $R^2 = 0.17$). Study population was subdivided based on plasma glucose levels and the correlation was evaluated between plasma and salivary glucose. Pearson's correlation coefficients of the subgroups "< 126 mg/dL", "126 to 200 mg/dL" and "> 200 mg/dL" were 0.33 ($p = 0.033$), 0.49 ($p = 0.009$) and 0.71 ($p = 0.007$) respectively.

Conclusion

Fasting salivary glucose level can be used as a non-invasive diagnostic and monitoring fluid to assess the glycaemic status in DM patients. However, there is pronounced correlation in females and patients with plasma glucose > 200 mg/dL. Further studies including larger populations from different geographical areas are required to establish saliva instead of blood for diagnosis and monitoring of DM.

Key words

Salivary glucose, diabetes mellitus