OP 16 - Effect of Sample Volume Variation and Time Delay in Analysis on Plasma Glucose Concentrations in Healthy Adults

Dharmasena I.A.[a#], Siriwardhana I.D.[b], Attanayake A.P.[c]

aDepartment of Medical Laboratory Science, Faculty of Allied Health Sciences, University of Ruhuna
bDepartment of Pathology, Faculty of Medicine, University of Ruhuna
cDepartment of Biochemistry Faculty of Medicine, University of Ruhuna

[#]***Corresponding author:*** *isuruanupamadharmasena@gmail.com*

Background: The primary test in the diagnosis and management of diabetes mellitus is the plasma glucose concentration. Venous blood is collected into tubes that contain antiglycolytic agents to prevent *in vitro* glycolysis. However, a complete inhibition of *in vitro* glycolysis is a major challenge in current laboratory practice. In addition to overfilling and under filling of tubes, samples are rarely analyzed within the recommended time period of one hour from collection.

Objectives: To determine the effect of sample volume variation and time delay in the analysis of plasma glucose results in healthy adults.

Methodology: A total of 30 individuals aged between 20-25 years were selected for the study. A 6.5 mL of blood sample was taken from each participant and added into three fluoride oxalate collection tubes in volumes of 1.0 mL, 2.0 mL and 3.0 mL. Samples were centrifuged and plasma glucose concentration measured at 1 hour, 3 hours and 5 hours after the sample collection using glucose oxidase method. Samples were kept at room temperature until analysis.

Results and conclusions: There is a statistically significant difference in glucose concentration in 1.0 mL, 2.0 mL and 3.0 mL volumes of samples analyzed after 5 hours of collection with the baseline control; 2.0 mL sample analyzed after 1 hour of collection (p< 0.05). There is no significant difference in plasma glucose results between different sample volumes (p>0.05) at a specific time point. At constant sample volumes, there is a significant difference between results after 1 and 5 hours of collection in 2.0 mL and 3.0 mL volumes and between 3 and 5 hours in 3.0 mL of samples (p<0.05). The sample volume variation in 2.0 mL fluoride oxalate tube from 1.0 mL to 3.0 mL does not significantly affect the plasma glucose results. However even in the presence of a glycolytic inhibitor the plasma glucose concentration decreases upon delaying the analysis after one hour of sample collection.

Keywords: Diabetes mellitus, glucose estimation, glycolysis, volume variation.