Abstract No: 485 *Health Sciences*

A COMPARISON BETWEEN SODIUM FLUORIDE AND ACIDIFIED BLOOD SAMPLES TO PREVENT *IN-VITRO* REDUCTION OF BLOOD GLUCOSE

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Sodium fluoride is the most widely used preservative in the *in vitro* preservation of blood glucose. However, a significant reduction in blood glucose concentrations in the NaF added samples has been revealed by previous studies and many new emerging techniques have been proposed to counter this drawback. This study was carried out in order to validate the use of sodium fluoride as a preservative of blood glucose and to decide on a simple and more reliable alternative method for preserving blood glucose concentration using citric acid.

A total of 103 volunteers participated in this study. Three milliliters (3 ml) of fasting or random blood samples were obtained from each participant and five different glucose determinations were made based on samples obtained at the same time, but handled differently. These five determinations of glucose included the immediate glucose concentration in plain tube, 1st hour glucose concentrations in $NaF/K_2C_2O_4$ (1mg/3mg, 1.0 ml Draw) containing bottles and citric acid/EDTA-2Na (5mg / 2mg, 1.0 ml Draw) containing bottles and the 2nd hour glucose concentrations in $NaF/K_2C_2O_4$ (1mg/3mg, 1.0 ml Draw) containing bottles and citric acid/EDTA-2Na (5mg / 2mg, 1.0 ml Draw) containing bottles. The values obtained from the immediately processed plain tubes were taken as the baseline glucose concentrations. Blood samples preserved with NaF and citric acid were stored at room temperature and analysed after 1 hour and 2 hours of collection and the values obtained were compared against control value from the plain tube. Statistical Package for Social Sciences (SPSS 15.0) was used to analyze data. Results obtained were compared using paired two tailed Student's t-test. Significance was accepted at < 0.05 in all cases.

Results showed that there was a significant reduction in the mean glucose concentration in comparison to the baseline glucose concentration [8.9 mg/dL or 8.8% at 1 hr and 12.2 mg/dL or 11.9% at 2 hr; $p < 0.05$] when blood was drawn into tubes containing $NaF/K_2C_2O_4$. In contrast, the reduction in the mean glucose concentration was comparatively less [2.3 mg/dL or 2.2% at 1 hr and 4.4 mg/dL or 4.1% at 2 hr] when blood was drawn into tubes containing citric acid/EDTA-2Na.

Based on the findings of this study, the citric acid containing tubes are statistically superior to the NaF containing tubes in the *in vitro* preservation of blood glucose. Treating blood samples with citric acid (Acidifying blood samples) minimizes the loss of glucose *in vitro* and thereby minimizes the risk of missing cases with glucose concentrations near the upper limit of the normal reference range. Therefore, citric acid would be a simple and more reliable alternative for the use of NaF in the *in vitro* preservation of blood glucose.