COMPARING GLUCOSE RESULTS OBTAINED FROM OKMETER IN EMERGENCY UNIT WITH LABORATORY RESULTS USING AUTOMATED MACHINE IN KHMC

ABSTRACT

Objectives: The purpose of this study was to compare the results of the glucose blood test measurements obtained using OKmeter in emergency unit with laboratory results using automated machine in KHMC.

Method: A method-comparison design was used. The analysis applied on 120 patients by using OKmeter and clinical laboratory analyzer (Hitachi 902). A t test was used to determine differences in glucose values obtained via the two methods. Differences and limits of agreement were calculated.

Results: The result you obtain from your meter may differ somewhat from your laboratory test due to different factors and conditions. Meter results can be affected by factors and conditions that do not affect laboratory tests in the same way. You may still have a variation from the result because blood glucose levels can change significantly over short periods of time, especially if you have recently eaten, exercised, taken medication, or experienced stress. In addition, if you have eaten recently, the blood glucose from finger stick can be up to 70 mg/dl higher than blood drawn from a vein (venous sample). Therefore, it is best to fast for eight hours before doing comparison tests. Factors such as the amount of blood cells in the blood (a high or low hematocrit) or the loss of body fluid (severe dehydration) may also cause a meter result to be different from a lab result.

Conclusion: Regression analysis shows a very strong positive relation (Pearson correlation r = 0.978) between the values of the blood glucose testing using OKmeter in emergency unit with laboratory results using automated machine in KHMC. Laboratory glucose values OKmeter in emergency unit using in one sample t test (t1,117 = 0.053) with mean 149.3 and 95% confidence interval of the difference, while the machine (Hitachi 902) values (t2,117 = 0.015) with mean 144.10, and Reliability statistics results (Cronbach's alpha 0.988).

KEY WORDS: ACCU-CHEK, Blood Glucose, OKmeter, Accuracy, Regression Analysis, Reliability.
1. INTRODUCTION

Diabetes mellitus is a disorder carbohydrate metabolism characterized by hyperglycemia glycosuria, and after some years of disease, varying clinical complications. For a non-diabetic adult, the normal blood glucose value should be (70 -110) mg/dl after fasting and less than 140 mg/dl two hours after meal (1,2,3).

1.1 Principle of measurement OKmeter:

Blood glucose is measured by an electrical current that is produced when a blood sample mixes with the reagents (special chemicals) of the test strip. The electrical current changes with the amount of glucose in the blood sample. The Okmeter measures the strength of the electrical current and displays the results as a blood glucose level.

1.2 Principle of automated system measuring:

Tests are measured by the photometer. The photometric measuring system detects color or turbidity change produced by chemical reactions between reagents and the analyte of interest in the sample. The photometric measuring system is capable of monochromatic and biochromatic photometer of endpoint, kinetic, ultraviolet, and visible light chemistry determinations (4).

The purpose of these studies is to improve the staff induction to the people working in this field about the facts of the accuracy of self-monitoring of blood glucose systems (5,6).

Accuracy can be defined as the closeness of a test result with an accepted reference value. There are multiple drivers of accuracy, including manufacturing processes, environmental factors and patient use.

All self-monitoring blood glucose systems approved by the U.S. Food and Drug Administration (FDA) must meet the minimum 15/20 requirements of ISO 15197, while multiple studies assert accuracy claims.

2. RESULTS AND DISCUSSION

The results obtained from your meter may differ somewhat from your laboratory test due to different factors and conditions. Meter results can be affected by factors and conditions that do not affect laboratory tests in the same way. You may still have a variation from the result because blood glucose levels can change significantly over short periods of time, especially if you have recently eaten, exercised, taken medication, or experienced stress. In addition, if you have eaten recently, the blood glucose from finger stick can be up to 70 mg/dl higher than blood drawn from a vein (venous sample). Therefore, it is best to fast for eight hours before doing comparison tests. Factors such as the amount of blood cells in the blood (a high or low hematocrit) or the loss of body fluid (severe dehydration) may also cause a meter result to be different from a lab result (12).
The study was conducted on 120 patients using the values of the blood glucose testing using OKmeter in emergency unit and laboratory results using automated machine (Hitachi 902) in KHMC. The result shows the strong relation (figure 1).

Our findings of significant differences between glucose testing using Okemeter in emergency unit and laboratory results using automated machine are similar to findings of previous studies.

Although most studies did not report the number of patients with large differences between the values of the glucose blood test using different methods (10), (11),

We can suggest to use point-of-care glucose analysis to help in management of time to treatment decisions, the laboratory testing for glucose is best, since the greater the need for precision (8), (9).

FIGURES

Figure 1: Graph of the linear relation between the machine and the lab glu-test.
CONCLUSION

Regression analysis shows a very strong relation (Pearson correlation $r = 0.978$) between the values of the blood glucose testing using OKmeter in emergency unit with laboratory results using automated machine in KHMC. Laboratory glucose values OKmeter in emergency unit using $t$-test ($t_{1,117} = 0.053$) with mean 149.3 and 95% confidence interval of the difference, while the machine (Hitachi 902) values ($t_{2,117} = 0.015$) with mean 144.10, reliability statistics results (Cronbach's alpha 0.988).

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