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Paper Spotted Blood Glucose for Quality Control of Reflectance Meters

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The usefulness of blood glucose results obtained with various teststrips and reflectance meters rely mainly on the quality of the strip and the skills of the analyst. Dependable quality control, therefore, remains a main task for the large hospital when decentralizing analysis of bloodglucose close to the patient or to satellite laboratories. Adequate quality control has, however, been inhibited by the lack of blood that is resistant to glucolysis and still appropriate to teststrip chemistry. This study reports the applicability of filter paper sampling of capillary blood to quality control of decentralized glucose determination.

Methods: Capillary blood (~ 50 µL) was applied on filter paper. A split sample was assayed with decentralized reflectance meters, i.e.: the Dextrostix Glucometer (Ames) or the Reflotest-Glucose Reflomat and the Reflocheck-Glucose Reflocheck system (Boehringer Mannheim) and the result written on the filter paper. The papers were mailed once weekly to the laboratory. There, the spots were punched out and assayed as detailed in Clin Chem 35:706-709, 1985 with the routine laboratory procedure using glucose hexokinase.

Results: The accuracy of the filter paper method was 0.96X + 0.4 (n=68, r=0.98) with intra- and interassay C.V. of 1.2-5.2% and 9.9-4.4%, respectively. Analytical recovery was 80%. The results were stable during 3 weeks. The regression equations for the glucometer systems were Y= 1.04X - 0.3 (n=50, r=0.96) and Y= 0.98X + 0.3 (n=46, r=0.98). For the Reflocheck Y= 0.95X + 0.5 (n=46, r=0.95) and the Reflomat systems Y= 1.03X + 0.3 (n=39, Y=0.96), Y= 0.86X + 1.1 (n=43, r=0.96) and Y= 0.85X + 0.9 (n=43, r=0.95).

Conclusion: The filter paper method is useful for quality control of decentralized glucose determination. Problem cases can be identified as exemplified by our finding of 3 different regression equations for the same reflectance meter system, one of which gave results very close to the identity line.