after 2 h only 7% of our 50-g modified glucose monomer solution remained in our subject's stomach. If a 50-g glucose polymer solution were given in 450 mL of water (creating a lower number of calories), we would expect gastric emptying to be equal to that of our modified 50-g glucose monomer solution.

The modified solution allows for a "clean bolus" to be rapidly emptied by the stomach and absorbed. The rapid emptying of the modified glucose solution creates a consistent plasma glucose peak at 30 min in nondiabetic patients. In our research we have found that the first (earliest) change from nondiabetic to impaired glucose metabolism after ingestion of the modified glucose solution can be noted by a shift from peak concentrations in plasma from 30 to 60 min (owing to a delayed insulin response). Because of the gastric emptying delay seen with ingestion of the glucose polymer (similar to the hyperosmolar standard glucose solution), use of this solution would not produce a distinct peak glucose value in plasma at 30 min.

The glucose monomer solution may have more rapid intestinal absorption, which would further enhance the rapid glucose delivery to the peripheral concentration. Návery et al. (4) found that a drink containing a glucose monomer tended to induce higher concentrations of insulin and C-peptide than did a polymer-containing drink of equivalent concentration, perhaps because of the faster intestinal absorption of a monomer solution than of a polymer.

We and other authors (5, 6) believe that if a large oral glucose load (75-100 g) is given, the high glucose values do not necessarily correspond to a higher blood glucose level actually delaying gastric emptying. Even though the osmolarity is decreased with the polymer solution, the associated gastric emptying should still be delayed because of the increased peripheral blood glucose values (statistically equal for both the 100- and 75-g monomer and polymer glucose solutions) (7, 8).

Various authors have reported results of using glucose polymer solutions produced by different companies for OGTTs (7, 8). Glucose polymer solutions differ in the amounts of maltose, maltotriose, polysaccharides, and glucose added. The variability of the glucose polymers themselves would make an OGTT difficult to standardize if this solution were given. Use of the 50-g glucose monomer allows for easier duplication and standardization.

We are very pleased to see other researchers investigating the problem of early diagnosis of diabetes. Although both the glucose polymer and our 50-g modified glucose monomer solution alleviate the incidence of nausea, we believe use of our solution allows for more rapid gastric emptying and, hence, a more sensitive, easily interpretable (by use of a curve) test.

References

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To the Editor:
I found the reply by Schwartz and Phillips interesting, but take issue with their statement that the presumed delayed gastric emptying of a glucose polymer solution would not produce a distinct peak glucose value in plasma at 30 min.

Of 36 normal individuals (i.e., no evidence of glucose intolerance or diabetes, and not pregnant) 18 had concentrations of serum glucose at 1 h were below those at time 0, and a further 13 had concentrations not more than 2 mmol/L above the fasting value. There were thus 31 out of 36 normal subjects whose glucose peak may be inferred to have occurred well before 1 h after the glucose polymer load, although no 30-min sample was taken.

Similarly, with a 75-g glucose load, 23 out of 31 had a 1 h serum glucose less than 2 mmol/L above the fasting value, of whom 14 had results below their fasting value.

The reason for using the WHO protocol is that it provides a universal standard, as opposed to the proliferation of a range of tests, such that individuals may be diagnosed as diabetic by some and not by others.

C. M. Colley

Effect of Temperature on Glucose Results Obtained with the Refiolux II

To the Editor:
During the exceptionally hot summer of 1989, Nursing Staff at the Luton & Dunstable Hospital began to experience problems achieving target values for quality control of blood glucose.

Numerous sites within the hospital were all using the Refiolux II meter (BM test systems; Boehringer Corp. Ltd., Lewes, East Sussex, U.K.) with Sugar-Chex whole-blood glucose control (Streck Laboratories Inc., Omaha, NE).

The glucose monitoring system is based on temperature-dependent enzymatic reactions. We had already noticed lower glucose results for control samples when the laboratory was cold and suspected the opposite effect when ambient temperatures exceeded 30 °C. The manufacturers state that glucose determinations must be performed between 18 and 36 °C and that the test strips should not be stored below 2 °C or above 30 °C. The recommended storage temperature for the Sugar-Chex control is between 20 and 30 °C, this also being the operational range for the quoted quality-control limits.

To quantify the extent of any temperature effect within the recommended operational ranges, we placed the following items in a warm (27 °C) room to equilibrate a Refiolux II meter, BM-test 1-44 strips, and three Sugar-Chex whole-blood controls (low, medium, and high). Each control sample was analyzed 20 times at the ambient temperature.

We then repeated the analyses after a period of equilibrating the same items in an air-conditioned room (constant temperature of 21 °C). We found that glucose results increased with temperature at all three concentrations tested.

CLINICAL CHEMISTRY, Vol. 36, No. 9, 1990 1705