

Postprandial Insulin and Triglycerides after Different Breakfast Meal Challenges: Use of Finger Stick Capillary Dried Blood Spots to Study Postprandial Dysmetabolism

Sonia Kapur, Ph.D., Margaret N. Groves, M.Phil., David T. Zava, Ph.D.,
and Sanjay Kapur, Ph.D.

Abstract

Background:

High levels of insulin and lipids following a meal are recognized risk factors for atherosclerosis. Monitoring such risk factors in the general population is hampered by the inconvenience of venipuncture blood collection, particularly for both premeal and postmeal analyses. This study examined insulin and triglyceride levels in dried blood spots (DBSs) collected after different breakfast meal challenges to assess the potential of this method for risk assessment.

Methods:

Glucose levels were measured using a glucose meter, and insulin and triglycerides were determined in DBS samples collected from 19 healthy volunteers before and at four time points up to 2.5 h after consuming each of five typical breakfast meals varying in nutritional composition.

Results:

At 2 h, glucose was within normal postprandial values (<140 mg/dl) for all meals; significantly lower glucose was seen after meal 2 (the lowest carbohydrate content) compared to the other meals. Insulin returned to normal fasting levels (<15 μ IU/ml) in significantly more subjects (90%) after meal 2 and significantly fewer subjects (31%) after meal 4 (highest carbohydrate content) than the other meals. Triglycerides were elevated to a similar extent in all subjects, with no significant differences between meals; levels were still rising at 2.5 h.

Conclusions:

Subjects were able to collect blood spots with minimum disruption to their normal daily activities. Relative ease of collection, analyte stability in dried blood, and the close correlation with serum levels that we have previously demonstrated makes DBS a convenient and simple tool for assessing the individual impact of different diets on postprandial dysmetabolism.

J Diabetes Sci Technol 2010;4(2):236-243

Author Affiliation: ZRT Laboratory, LLC, Beaverton, Oregon

Abbreviations: (BMI) body mass index, (CHD) coronary heart disease, (DBS) dried blood spot, (PPG) postprandial glucose

Keywords: blood spot, cardiometabolic risk, insulin, postprandial, postprandial dysmetabolism, triglycerides

Corresponding Author: Sanjay Kapur, Ph.D., ZRT Laboratory, LLC, 8605 SW Creekside Place, Beaverton, OR 97008; email address skapur@zrtlab.com