Low Plasma Glucose with Normal Finger-stick Glucose

Sankha S. Basu, Melanie Johncilla, Stacy E. Melanson, and Petr Jarolim*

CASE DESCRIPTION

A 63-year-old man with metastatic lung cancer admitted for severe hip pain and malaise was noted to have erratic daily morning plasma glucose concentrations, with several critical values below 40 mg/dL (<2.2 mmol/L). Each time he had a critically low laboratory glucose value, a point-of-care finger-stick glucose was found to be within reference intervals. The remaining chemistry results were notable for occasional mild hypocalcemia and hypophosphatemia. He exhibited no clinical signs of hypoglycemia and work-up for infection was negative.

QUESTIONS

1. Which values are likely correct, the finger-stick glucose or the plasma glucose?
2. What can cause falsely low plasma glucose?
3. What can be done to prevent the falsely low glucose measurements?

The answers are below.

ANSWERS

The lack of symptoms indicates that plasma glucose is likely falsely low; common causes include delayed separation, leukocytosis, and hypoperfusion. The patient had a marked leukocytosis (white blood cell count of >30 000 cells/μL), a phenomenon commonly associated with solid tumors, particularly non–small cell lung cancer (1, 2). The decrease in glucose concentration was directly proportional to both the leukocyte count and preanalytical time, confirming unusually high leukocyte-mediated in vitro glucose consumption (3, 4). Immediate whole blood measurement and glucose testing using a fluoride-containing tube were within reference intervals and confirmed this suspicion (5).

Author Contributions: All authors confirmed they have contributed to the intellectual content of this paper and have met the following 3 requirements: (a) significant contributions to the conception and design, acquisition of data, or analysis and interpretation of data; (b) drafting or revising the article for intellectual content; and (c) final approval of the published article.

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* Address correspondence to this author at: Brigham and Women’s Hospital, 75 Francis St., Boston, MA 02115. Fax 617-731-4872; e-mail pjarolim@partners.org.

Received October 2, 2013; accepted October 22, 2013.
DOI: 10.1373/clinchem.2013.216747