

A Case Report of Pseudohypoglycemia in a Patient with Leukocytosis

Michael A. Weintraub, MD, Deepika Nandiraju, MD, and Monika Shirodkar MD

INTRODUCTION

Hypoglycemia is most convincingly documented by Whipple's triad: low plasma glucose, symptoms of hypoglycemia and relief of symptoms after treatment.¹ Pseudohypoglycemia is a condition where there is an artifactually low glucose concentration and an absence of hypoglycemic symptoms. We present a case of pseudohypoglycemia where leukocytosis played a role in lowering venous glucose.

CASE DESCRIPTION

A 65-year-old male with a history of gout was admitted for evaluation of hematuria. Labs during his admission revealed a venous blood glucose of 43mg/dl. Point of care glucose checks were not ordered on admission as the patient was not diabetic. The patient was fully alert and oriented with no somnolence, diaphoresis or palpitations. He was not taking any antihyperglycemic medications at home, and he had an HbA1c of 6.2%. He was hemodynamically stable with no signs of infection. The only other lab abnormality noted was a leukocytosis of 95,000/ μ L. Point of care glucose checks were ordered with meals and at bedtime. A subsequent venous blood glucose was 27mg/dL, but the patient remained asymptomatic and a simultaneous point of care glucose was 92mg/dL. A close evaluation of the case revealed a delay between phlebotomy time and processing of the venous sample. Immediate processing of the following venous sample revealed a normal glucose (90mg/dL) that correlated with the simultaneous point of care glucose. Repeat testing with quick processing of the sample clarified that the measurements of low venous blood glucose levels were due to *in vitro* glucose consumption by leukocytes that occurred between the times of phlebotomy and sample analysis.

DISCUSSION

Pseudohypoglycemia is not a clinical syndrome, but rather a reflection of artifactually low glucose concentration. Although there are case reports in the literature, this phenomenon is under-recognized among health care professionals. Causes of pseudohypoglycemia differ based on the method of glucose measurement.² Low capillary blood glucose is seen with decreased perfusion because decreased perfusion leads to increased

glucose uptake by peripheral tissues. Some common clinical examples include patients with peripheral vasoconstriction in hypovolemic shock, Raynaud's disease and peripheral vascular disease. In contrast, low venous blood glucose levels can be observed in leukemia or polycythemia vera where high nucleated cell counts cause increased glycolysis.^{3,4} Waldenstrom macroglobulinemia has also been reported to generate falsely low venous blood glucose readings due to interference of the proteins with the lab result.⁵

CONCLUSION

Pseudohypoglycemia should be considered in asymptomatic patients with low blood glucose levels before initiating an extensive work up.

REFERENCES

1. Lee KT, Abadir PM. Failure of Glucose Monitoring in an Individual with Pseudohypoglycemia. *Journal of the American Geriatrics Society*. 2015 Aug;63(8):1706-8.
2. Pitkin AD, Rice MJ. Challenges to Glycemic Measurement in the Perioperative and Critically Ill Patient: A Review. *Journal of diabetes science and technology*. 2009 Nov;3(6):1270-81.
3. Assaad SN, Vassilopoulou-Sellin R, Samaan NA. Pseudohypoglycemia in chronic leukemia. *Tex Med*. 1988 Jul;84(7):36-7.
4. Farfel Z, Freimark D, Mayan H, Gafni J. Spurious hypoglycemia, hyperkalemia and hypoxemia in chronic hemolytic anemia. *Isr J Med Sci*. 1990 Nov;26(11):606-10.
5. Tarasova VD, Zena M, Rendell M. Artifactual Hypoglycemia: An Old Term for a New Classification: Table 1. *Diabetes Care*. 2014 May;37(5):e86.