

Blood Glucose Monitoring in Hospitalized Patients

Mona Boaz MD, Zohar Landau MD and Julio Wainstein MD

Diabetes Unit, Wolfson Medical Center, Holon, Israel

KEY WORDS: hyperglycemia, glucometer, in-patient care, diabetes, outcome

IMAJ 2010; 12: 501–502

Hyperglycemia is a frequently observed metabolic derangement, reported to be present in approximately one-third of hospitalized patients [1,2]. Diabetes care during hospitalization has received increasing attention during the last decade, and a number of recent studies have reported that glucose control during hospitalization in intensive care units is indeed clinically meaningful, both for individuals with known diabetes and for patients without this diagnosis [3–5]. Despite these reports, some clinicians resist attempts to increase glycemic control in the hospitalized diabetic patient, primarily due to anxiety on the part of the medical staff regarding increased risk of hypoglycemic events and even death [6,7]. These fears notwithstanding, many clinicians view the hospitalization period as a window of opportunity to improve diabetes care.

In recent years, the institutional glucometer has replaced the old personal glucometer still in use in many hospitals in Israel and abroad. But at hospitals such as Assaf Harofeh in Zerifin and Wolfson in Holon, for example, the new glucometer is in use and this instrument facilitates hospital care of the diabetic patient through processes such as documentation, follow-up, quality control, data analysis, etc. [8]. This enables identifying and tracking trends regarding the level of the individual patient and the patient population at large. These instruments are also more

accurate and more reliable than older glucometers [9]. In Israel, the National Diabetes Council has recommended the use of these institutional glucometers to the Ministry of Health, noting that they facilitate diabetes care and improve glucose homeostasis during the hospitalization of diabetic patients.

The main purpose of implementing projects such as the Program for the Treatment of the Hospitalized Diabetic Patient (PTHDP) at Wolfson Medical Center is to utilize the diabetic patient's hospitalization as an opportunity to empower patients and help them recognize their ability to control their disease [8].

In agreement with the findings of our report [8], the present study by Buchs and Rapaport in this issue of *IMAJ* [10] found that the glucometer was an effective tool to facilitate glucose homeostasis in the hospitalized diabetic patient. Nevertheless, a few methodologic questions emerge from the reported data, three of which deserve mention. First, blood glucose was recorded from a single daily capillary measure for most patients. Because insulin-treated patients are expected to monitor blood glucose two to four times daily at home, it would have been instructive, and certainly clinically important, to have done so during the hospitalization period. The average glucose level reported in this study's population is 161 mg/dl, which corresponds to an HbA1c level of about 7.4%. This is a most impressive achievement in a diabetic patient population, particularly during the stress of hospitalization. HbA1c levels are typically around 8% in community-dwelling diabetic individuals, so such low levels during illness may reflect exceptional diabetes care in the community setting. Third, glucose values on the first day

of hospitalization were 132–155 mg/dl and remained stable throughout hospitalization until discharge. It is not clear whether these initial values were obtained in the emergency room, but they do seem lower than expected and are consistent with unusually good diabetes care prior to hospitalization.

Despite our questions regarding methodology, we agree with Buchs and co-authors that the time has come to adopt the electronic database. It is clearly superior to the current paper-based system. And we agree that the institutional glucometer is an important step in that direction, one that will improve patient care and facilitate patient autonomy.

Corresponding author:

Dr. J. Wainstein

Diabetes Unit, Wolfson Medical Center, Holon 58100, Israel

Phone: (972-3) 502-8716

email: wainstein@wolfson.health.gov.il

References

- Clement S, Braithwaite SS, Magee MF, et al. for the American Diabetes Association Diabetes in Hospitals Writing Committee. Management of diabetes and hyperglycemia in hospitals. *Diabetes Care* 2004; 27: 553–91.
- Garber AJ, Moghissi ES, Bransome ED Jr, et al. for the American College of Endocrinology Task Force on Inpatient Diabetes Metabolic Control. *Endocr Pract* 2004; 10(Suppl 2): 4–9.
- Malmberg K, Rydén L, Wedel H, et al. for the DIGAMI 2 Investigators. Intense metabolic control by means of insulin in patients with diabetes mellitus and acute myocardial infarction (DIGAMI 2): effects on mortality and morbidity. *Eur Heart J* 2005; 26: 650–61.
- Van den Berghe G, Mesotten D, Vanhorebeek I. Intensive insulin therapy in the intensive care unit. *CMAJ* 2009; 180: 799–800.
- Furnary AP, Braithwaite SS. Effects of outcome on in-hospital transition from intravenous insulin infusion to subcutaneous therapy. *Am J Cardiol* 2006; 98: 557–64.
- Giangola J, Olohan K, Longo J, Goldstein JM, Gross PA. Barriers to hyperglycemia control in hospitalized patients: a descriptive epidemiologic

- study. *Endocr Pract* 2008; 14: 813-19.
7. Hermanides J, Vriesendorp TM, Bosman RJ, Zandstra DF, Hoekstra JB, Devries JH. Glucose variability is associated with intensive care unit mortality. *Crit Care Med* 2010; 38: 838-42.
 8. Boaz M, Landau Z, Matas Z, Wainstein J. Institutional blood glucose monitoring system for hospitalized patients: an integral component of the inpatient glucose control program. *J Diabetes Sci Technol* 2009; 3: 1168-74.
 9. Karon BS, Gandhi GY, Nuttall GA, et al. Accuracy of roche accu-check inform whole blood capillary, arterial, and venous glucose values in patients receiving intensive intravenous insulin therapy after cardiac surgery. *Am J Clin Pathol* 2007; 127 (6): 919-26.
 10. Buchs AE, Rapoport MJ. Institutional glucometrics to determine glucose control as practiced by general medical wards. *IMAJ Isr Med Assoc J* 2010; 12: 463-7.