

Inpatient Management of Hyperglycemia and Diabetes

Preface

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Guest Editor

I feel as if we have come full circle in diabetes care. Early in my nursing career, I began to focus on the care of people with diabetes in the hospital. Many people, especially those with type 1 diabetes, were admitted to the hospital at the time of diagnosis and spent several days learning how to inject insulin, measure glucose in urine, and make decisions about meals, physical activity, and medication. Diabetes educators were rare, and outpatient education programs were also few and far between. Short-term hyperglycemia was not considered harmful, and the use of sliding-scale regular insulin was pervasive.

Over time, insurance reimbursement for extended inpatient self-management education has been questioned, and the focus has shifted to outpatient services. Many believed hospitalization was lacking in “teachable moments,” as patients struggled with the stresses and strains of being acutely ill. In the past decade, compelling research into the consequences of short-term hyperglycemia in critically ill patients has provided a wake-up call. It appears that strict glycemic control in the hospital—even for those without a diabetes diagnosis—does matter after all.

Researchers continue to examine various patient populations and glycemic targets to help establish evidence-based guidelines. So, how do we improve the care we are delivering to our patients with diabetes once they are admitted to an acute-care facility? Most health care providers are not diabetes experts and are uncertain about how to effectively initiate and titrate insulin. Some are not aware of or have not embraced the glycemic targets recommended for inpatients by the American Diabetes Association and the American Association of Clinical

Endocrinologists.¹ In addition, many standard hospital routines and treatments can sabotage our best efforts to achieve glycemic targets for these patients.

Given the seriousness of this matter, I am delighted that this *Diabetes Spectrum* From Research to Practice section is devoted entirely to inpatient hyperglycemia management. As guest editor, I hope to provide you with many ideas and approaches to improving glycemic control in the acute-care setting. As you will see, strategies that have the most impact must be implemented throughout the health care system, and staff must be educated and motivated to follow policies and protocols, much as we educate patients to follow their treatment regimens.

We begin this section with Karen A. McKnight, RD, LD, and Lorri Carter, RD/LD, CDE, providing a fresh outlook on how the healing powers of food and nutrition can be enhanced during hospitalization (p. 233). The authors review the system-wide challenge of safely coordinating blood glucose monitoring, insulin administration, and meal tray delivery. They offer practical suggestions for how best to improve this process to reduce both hyper- and hypoglycemic glucose excursions during hospitalization.

Next, Gregory A. Maynard MD, MSc; Maggie Patricia Huynh, PharmD; and Marian Renvall, MSc, discuss iatrogenic hypoglycemia as a significant barrier to improved glycemic control in acute care (p. 241). They look at demographics, known risk factors, recurrence of hypoglycemia during the same admission, and breakdowns in treatment protocols to gain insight into ways to prevent hypoglycemia in the hospital. The authors' experiences at the University

of California, San Diego Medical Center, offer a variety of opportunities for improvement that can be implemented in many hospital settings.

In our third article, M. Cecilia Lansang, MD, MPH, and Guillermo E. Umpierrez, MD, provide an overview of the dangers of uncontrolled hyperglycemia in hospitalized patients and its impact on morbidity and mortality (p. 248). They discuss the benefits of insulin therapy and provide examples of physiological basal-bolus insulin regimens. The authors also examine some root causes for hyperglycemia and offer some strategies to improve outcomes. These approaches include educational initiatives and the development of practice protocols.

Continuous intravenous insulin (CII) is the topic of our next article, by Nancy J. D'Hondt, RPh, CDE (p. 255). She makes the case for using CII to effectively counteract hyperglycemia in critically ill, unstable, and surgical patients and provides the rationale for using intravenous instead of subcutaneous insulin in these patient groups. This article also reviews the key components of CII protocols, predictors of glucose variability, the role of the interdisciplinary team in promoting best practices, measures that can reduce errors, and the use of CII in noncritical-care areas.

Joyce Malaskovitz, PhD, RN, CDE, and Charlotte Hodge, RN, NP, CDE, discuss the importance of data collection in efforts to improve the quality of inpatient hyperglycemia and diabetes management (p. 262). Dr. Malaskovitz is director of the diabetes treatment center at Desert Springs Hospital in Las Vegas, Nev., which has the distinction of being the first hospital to receive the Joint Commission's Certificate of Distinction for Advanced Inpatient Diabetes Care. The authors provide us with insight into the potential uses of careful data collection to guide practice changes and offer an overview of computerized insulin-dosing and data management tools.

Professional education, another key component of successful quality improvement, is the focus of our next article, by Carol S. Manchester, MSN, APRN, BC-ADM, CDE (p. 268). She explains the meaning of professional competency and discusses the importance of formalizing efforts to ensure that hospital staff members

have mastered the core competencies necessary to best serve patients with hyperglycemia or diabetes. She offers practical advice for providing engaging and effective education for staff and fostering safe diabetes self-management education for patients despite the challenges of acute illness and limited availability of expert care at the bedside.

Finally, Susan Rogers, RN-BC, BSN, CCM, discusses coordination of care during the transition from inpatient to outpatient settings, stressing the importance of communication (p. 272). She also reviews the crucial role of medication reconciliation and survival-skills education in optimizing patient outcomes.

I would like to take this opportunity to remind readers that diabetes management is both a science and an art. Each of these articles offers insights into components of diabetes care and guidelines for best practices. It behooves each of us to find creative ways to improve our diabetes care delivery.

In their article in this issue, Ms. McKnight and Ms. Carter discuss strategies to improve hospital meals. At NewYork Presbyterian Hospital-Weill Cornell Medical Center, where I am a diabetes nurse practitioner and educator, we have implemented strategies such as consistent carbohydrate counting (with choices ranging from three to five carbohydrate servings per meal tray), carbohydrate-friendly menus that indicate the number of carbohydrate servings for each carbohydrate-containing food, and expedited meal tray delivery to patients on the diabetes meal plan.

Drs. Lansang and Umpierrez mention in their article here the limited role of oral agents in the hospital and the need for both basal and bolus insulin administration. Again, at NewYork Presbyterian-Weill Cornell Medical Center, we recommend taking patients off long-acting insulin secretagogues during hospitalization to prevent potential hypoglycemia secondary to disruptions in mealtimes. We avoid using thiazolidinediones because of their increased risk of edema and heart failure, and we limit the use of metformin because of concerns during dehydration, during renal insufficiency, and during use of iodized contrast.² As a general rule, a peak-

less insulin, such as glargine, is used to address basal requirements. For patients on steroids or tube feedings, NPH insulin or a pre-mixed insulin formulation is preferred because the moderate peak of the NPH helps with the insulin resistance from the steroids or prolonged breakdown of the meal with tube feedings.

Such practice guidelines at my institution, as in many others, have developed from a blending of available evidence, consensus guidelines, and clinical experience. In the end, balancing the art and the science of inpatient diabetes management will facilitate your institution's journey toward improved glycemic control, one patient at a time.

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Note of disclosure: Ms. Seley has served on an advisory committee and received honoraria for speaking engagements from Sanofi-Aventis, which manufactures insulin glargine.