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EDITORIAL

Glycemic control at hospital: Why does it not improve?☆

Control glucémico en el hospital. ¿Por qué no mejora?

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The prevalence of diabetes in the adult Spanish population has doubled in the past two decades,¹ and has recently been estimated at 13.8%.² People with diabetes have a two-fold greater overall risk of death as compared to those without diabetes,³ and more than 50% of subjects with diabetes die from cardiovascular disease, mainly ischemic heart disease.⁴ In addition, diabetes is the leading cause of blindness, end-stage renal disease, and non-traumatic lower limb amputation.⁵ It is therefore not surprising that diabetes mellitus represents one of the most common and increasing diagnoses in hospitalized patients.⁶ Observational studies show that hyperglycemia during hospital admission is associated with a poor prognosis, particularly in patients with no history of diabetes,^{7,8} and that diabetes has a high impact on hospital admission and healthcare costs. Direct healthcare costs of diabetic patients are virtually double those of patients with no diabetes,⁹ and almost 50% of these expenses are caused by hospitalization episodes, which are more frequent and longer, and are associated with increased mortality in diabetic patients.^{10–12} All of this warrants the growing interest in the management of hyperglycemia during hospitalization.

In 2004, the American Association of Clinical Endocrinologists (AACE) convened a consensus conference on the management of hyperglycemia during hospital admission.¹³ The AACE and the American Diabetes Association (ADA) subsequently published an excellent review on the subject,¹⁴ and the ADA incorporated the management of hyperglycemia during hospitalization into the Standards of Medical Care.⁵ In Spain, a consensus on the hospital

treatment of hyperglycemia was published in 2009¹⁵ to promote and standardize the use of more physiological insulin therapy regimens. However, although dramatic improvements have occurred in some centers, where the use of basal-bolus schemes has increased from 17% to 93%,¹⁶ advances have been modest in many centers, and an overall change in clinical practice in hospital wards has not generally been achieved.

The observational study published by Botella et al.¹⁷ in the journal *Endocrinología y Nutrición* supports the high prevalence of hyperglycemia in hospitalized patients and illustrates how insulin schemes used during hospitalization have not significantly changed. Glycemic control of patients has not improved either, and continues to be clearly deficient.^{18,19} The proportion of patients on sliding scale fast-acting insulin regimens was 65%, while only 35% of patients were treated with the basal-bolus scheme. Probably because of the overuse of sliding scale regimens, only one third of patients had preprandial blood glucose values less than 140 mg/dL, and 22% had preprandial blood glucose values higher than 200 mg/dL. The ineffectiveness of sliding scale fast-acting insulin regimens has been amply documented,^{20,21} and is explained by their “reactive” approach and because they do not consider the different components of physiological insulin secretion. Basal-bolus regimens encompass the three components of insulin replacement (basal, prandial/nutritional, and correction), and are considered the schemes of choice for most patients during hospitalization. Multicenter, prospective, randomized studies have demonstrated the greater efficacy of these schemes as compared to sliding scale fast-acting insulin regimens^{22,23} and, when compared to regimens consisting of two doses of NPH/NPL or premixed insulin, are easier to standardize and provide greater flexibility in adapting to the frequently changing insulin requirements of hospitalized patients.¹⁵

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The reasons for this resistance to change in the clinical practice management of hyperglycemia in hospital wards are multiple, and include both unawareness of and the secondary importance attributed to hyperglycemia during hospital admission, which, in turn, is partly accounted for by the lack of quality evidence derived from clinical trials with hard clinical results. However, information from observational studies and the results of the Rabbit Surgery trial²³ support the objectives recommended by the AACE and ADA of maintaining preprandial blood glucose levels less than 140 mg/dL and random blood glucose levels less than 180 mg/dL in most patients, provided they can be achieved safely.^{5,14} On the other hand, clinical inertia is well documented in this area,²⁴ and is considered a key element for the persistence of sliding scale regimens. Despite their proven ineffectiveness, professionals routinely use sliding scale regimens just because they think they are the easiest to use in their clinical practice and, as with many other hospital practices, are transmitted from one generation to another. Breaking clinical inertia is one of the main challenges for improving glycemic control during hospitalization, and the most significant factors for overcoming it probably include the availability of data regarding the approaches and extent of control in the different hospitals, and also of results relating glycemic control to patient outcomes, instead of consensus views. In this context, the information provided by the Botella et al. study¹⁷ should make both professionals caring for patients and hospital managers reflect upon this aspect of hospital care. In order to successfully implement a protocol for the hospital management of hyperglycemia, it is also important that strategies are adapted to the characteristics of each center, are included in the care quality program of the center, and are implemented by a multidisciplinary team which, in addition to physicians and nurses in charge of direct patient care, includes other professionals such as endocrinologists, diabetes education nurses, pharmacists, dietitians, and information technology professionals. Finally, it should be noted that, as occurs with other interventions involving the entire hospital, implementation follows its own rhythm, and is usually slow.

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