

Inpatient Glycemic Control in 4 Easy Steps

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Introduction

As hospitals aim for better inpatient glycemic control to improve patient outcomes, it is essential for practitioners to work as an integrated treatment team to achieve the glycemic goals outlined by the American Diabetes Association (ADA), the American Association of Clinical Endocrinologists (AACE), and The Endocrine Society (TES).^{1,2} A simplified approach to inpatient glycemic control can help practitioners achieve better patient outcomes.

The overall management of inpatient hyperglycemia can be broken down into 4 easy steps: 1) *Identify* patients who require insulin therapy; 2) *Start* an appropriate initial total daily dose of insulin; 3) *Titrate* insulin doses on a daily basis to achieve the targeted glucose goals; and 4) *Transition* patients out of the hospital by developing a plan at discharge for continued success.

Identify

Step 1 can be simple if technology is used because the data are often readily available. A software surveillance tool can quickly and efficiently alert providers when patients have 2 glucose levels ≥ 180 mg/dL. However, processes must be in place to initiate glucose monitoring for patients at risk for hyperglycemia, including those with a history of diabetes mellitus, receiving enteral or parenteral nutrition, and/or who are being treated with corticosteroids.²

Identification can also be performed by a diligent inpatient glucose management team or individual providers. However, using a computer-based glucose surveillance tool for the initial step may be a better option.³

Start

Choosing the appropriate initial total daily dose of insulin for each individual patient is critical to establishing glucose control quickly, because patients have increasingly shorter lengths of stay in hospitals. For insulin-naïve patients, an initial total daily dose of insulin is best calculated based on body weight in kilograms, and is generally 0.3 to 0.5 units/kg.²

The initial starting dose for patients taking insulin at home is much easier to calculate, because the guesswork is removed. Their total daily dose is known and this information can be used to calculate the starting inpatient insulin dose. However, practitioners must consider an increase or decrease of the total daily dose of insulin given at home based on patients' glycated hemoglobin levels at admission, preadmission

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results of their self-monitored blood glucose levels, and the likely change in their carbohydrate intake because of dietary restrictions imposed during hospitalization.

Individual providers can calculate the initial starting dose or it can be completed by clinical pharmacists.

Once the total daily dose of insulin is established, it is divided into 50% basal insulin and 50% bolus meal-time insulin divided equally before each meal, along with a correction scale of insulin based on the total daily dose or the patient's body mass index.

Titrate

After the insulin therapy is started and the glucose targets are set, the next step is essential to achieving those targets. The daily titration of insulin doses is required to achieve and maintain glucoses within the predetermined glucose targets. Similar to the titration of heparin, insulin doses must be adjusted on a daily basis to identify the proper dose while avoiding unnecessary hypoglycemia or hyperglycemia.

This step can also be accomplished using insulin dosing software such as Glucommander, which is indicated for titrating intravenous insulin, transitioning patients from intravenous to subcutaneous insulin, and titrating subcutaneous insulin. This step can also be performed by the provider or clinical pharmacists.³⁻⁵

Transition

In attempting to limit 30-day readmissions and striving to help patients achieve long-term glucose control, transitioning them out of the hospital is critical to the success of any inpatient glycemic control program.^{6,7}

Patient glycated hemoglobin levels on admission can be used to assist in the transition home, because it can help practitioners determine if a change in therapy is warranted.⁸

The other essential aspects to a successful transition are patient and caregiver education regarding diabetes mellitus survival skills and insulin injection techniques, as well as proper communication with outpatient providers.

Conclusion

Ideally, this simplified therapeutic approach, in combination with hospital leadership engagement and an integrated inpatient glycemic control team, will help achieve the glycemic targets set by the ADA, the AACE, and TES. The better glycemic control achieved using this easy 4-step

approach will generate the better outcomes that patients deserve.^{1,2}

Conflict of Interest Statement

Andrew S. Rhinehart, MD, FACP, CDE, BC-ADM, CDTC, is employed by the Mountain States Health Alliance; is a consultant, member of the speakers bureau, and member of the advisory committee for Sanofi; is a member of the speakers bureau and the advisory committee for Amylin, AstraZeneca, Bristol-Myers Squibb, and Janssen; and is a member of the speakers bureau for Boehringer Ingelheim, Forest, Lilly, and Novo Nordisk.

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