

Effect of Overlapping Insulin Glargine Administration in Decreasing Incidence of Hyperglycemia after Discontinuation of Intravenous Insulin Infusion

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Background

- **Diabetes is a prevalent comorbid condition in the United States**
 - 34.2 million Americans diagnosed with diabetes¹
 - People with diabetes have an increased risk for hospitalizations
 - Substantial economic burden of direct medical costs led to an estimated \$237 billion in 2017²
- **The American Diabetes Association (ADA) currently recommends a target blood glucose of 140 to 180 mg/dL for critically ill patients in the ICU, general medicine or surgery units**
- **Glycemic control in patients with diabetes is crucial due to the potential for negative outcomes surrounding uncontrolled blood glucose (BG)**
 - Inpatient hyperglycemia is associated with an increased risk of complications and mortality
 - Improved glycemic control results in reduced infection rates, shorter hospital stays, lower mortality and reduced medical costs³
- **Hyper- or hypoglycemia among hospitalized patients is associated with an increased risk for complications, length of hospital stay and mortality**
 - Insulin remains the mainstay of treatment for uncontrolled blood glucose with either a continuous IV insulin infusion or SC insulin administration
 - Patients are often transitioned from IV to SC insulin, though loss of glycemic control is common
- **Consistent euglycemia requires consistent monitoring and careful titration and transitioning of IV and/or SC insulin**
 - Studies have supported the use of overlap therapy with SC insulin while IV insulin is still running to decrease the incidences of hyper- and hypoglycemia

Purpose

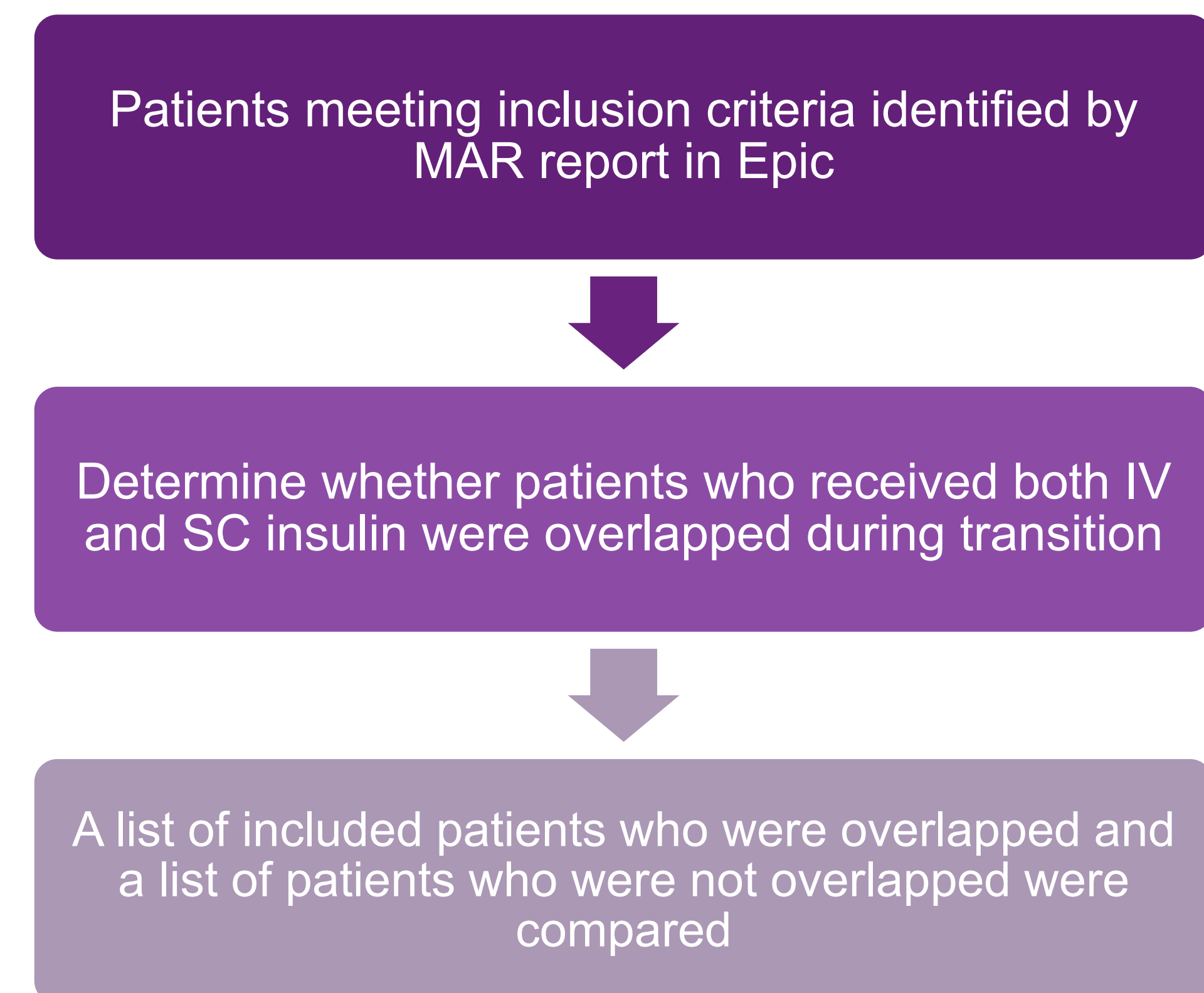
- Assess the incidence of hyperglycemia in patients being transitioned from an intravenous (IV) insulin infusion to subcutaneous (SC) insulin glargine
- Determine whether IV and SC overlap therapy decreases the incidence of hyperglycemia when transitioning patients
- **Goal:** outline the need for a protocol with appropriate transition (timing and dosing) from IV to SC insulin in order to prevent loss of glycemic control

Statistics

- Based on the assumption that there would be a 30% difference in incidences of hyperglycemia between groups, 36 patients would be needed in each group to achieve 85% power
- Primary endpoint, the incidences of hyperglycemia after discontinuation of IV insulin infusion, will be evaluated using a t-test
- Statistical significance will be determined using a p value >0.05

Methods

Retrospective chart review approved by the Institutional Review Board at Saint Francis Hospital and Medical Center (SFHMC) in Hartford, CT



Patient Criteria

- Inclusion**
- Admitted patients between March 1, 2020 and December 31, 2021
 - Male and female patients between the ages of 18 and 89 years
 - Continuous insulin infusion for at least 24 hours
 - Diagnosis of type 1 or type 2 diabetes mellitus
- Exclusion**
- No administration of subcutaneous insulin glargine
 - Primary admission diagnosis of diabetic ketoacidosis (DKA) or hyperosmolar hyperglycemia syndrome (HHS)

Data Collection Points

• Patient age & gender	• Total duration of insulin infusion	• Overlap time (if overlapped)
• Patient weight & BMI	• Total units of IV insulin in 24 hours prior to discontinuation	• Gap time from stop of IV drip to first dose of SC insulin
• Diagnosis of type I or II diabetes mellitus	• Units of SC insulin administered before IV infusion is stopped	• Lowest blood glucose
• Indication for insulin infusion	• Total units of SC insulin on day 0 of transition	• Highest blood glucose
• A1c on admission	• Overlap of IV insulin with SC insulin glargine (Y/N)	• Documentation of steroid administration

Anticipated Outcomes

Primary Outcome

- Occurrences of hyperglycemia (BG ≥ 180 mg/dL) post transition from an IV insulin infusion to a SC insulin glargine administration in the 24-hour period after the infusion has stopped

Secondary Outcomes

- Occurrence of hypoglycemia (BG ≤ 70 mg/dL) in the 24-hour period after stopping the continuous infusion
- Correction of hypoglycemia using dextrose
- Dose adjustments to the SC insulin glargine
- Need to restart the IV insulin infusion during hospitalization

Application to Practice

- Many hospitals have implemented protocols to assess the appropriate amount of insulin that should be administered titration-specific instructions
- Specific instances where IV and SC insulin would be appropriate includes patients on extended high-dose steroid therapy, DKA patients and patients that are admitted post-cardiac surgery

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Disclosures

Authors of this project have nothing to disclose concerning possible financial or personal relationships with commercial entities that may have a direct or indirect interest in the subject matter of this project.

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