Pro/Con: You Should ALWAYS Manage a Patient with SQ Insulin in an ASC

Leopoldo V. Rodriguez, MD, MBA, FASA, SAMBA-F (Pro)

Past-President, SAMBA

Chair, ASA Committee on Ambulatory Surgical Care

Anesthesiology & Perioperative Medicine Consultant

Boulder Valley Anesthesiology PLLC, Boulder CO

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Disclosures

- No financial interests
- Based on a literature review and extensive clinical experience, this presentation represents my opinion on this topic. It does not represent the views of SAMBA or ASA.
- Recommendations based on inpatient and critical care literature may not always apply to the ambulatory setting.

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Two different types of patients in Outpatient surgery (Ambulatory, HOPD, NORA)

1. Healthy or well managed patient undergoing invasive procedures that may be associated with fluid shifts and surgical stress:
   a. Total joint replacement
   b. Spine surgery
2. Unhealthy or poorly managed patient undergoing a less stressful procedures
   a. Cataracts
   b. Podiatric surgery
   c. Hand surgery
   d. Other minor procedures, such as lipoma excision, etc.

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Goals

1. Avoidance of hypoglycemia
2. Maintenance of BG in target range
3. Adequate BG monitoring, and
4. Expeditious resumption of oral intake and patient's medication regimen.

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2022 ADA Guidelines: Diabetes Care in the Hospital

Diabetes Care 2022;45(Suppl. 1):S244–S253 https://doi.org/10.2337/dc22-S016

- Insulin therapy should be initiated for hyperglycemia >180 mg/dL and targeted to a glucose range of 140–180 mg/dL (7.8–10.0 mmol/L) for most critically ill patients.
- Not as well supported by data from randomized controlled trials, **these recommendations have been extended to hospitalized patients without critical illness.**
- On the other hand, and in **glucose concentrations between 180 mg/dL and 250 mg/dL (10–13.9 mmol/L) may be acceptable in patients with severe comorbidities** inpatient care settings where frequent glucose monitoring or close nursing supervision is not feasible.

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Perioperative Care

Many standards for perioperative care ***lack a robust evidence base***.

1. The target range for blood glucose in the perioperative period should be 80–180 mg/dL (4.4–10.0 mmol/L). We prefer 140-180 to prevent hypoglycemia.
2. Metformin should be continued on the day of outpatient surgery.
3. Sulfonylureas should be discontinued (risk of hypoglycemia)
4. GLP-1 Receptor agonists (hold if at risk of aspiration) > consider gastric U/S. Amylin should be held (hypoglycemia)
5. SGLT2 inhibitors must be discontinued 3–4 days before surgery (euglycemic ketoacidosis)
6. Withhold any other oral glucose-lowering agents the morning of surgery or procedure and give half of NPH dose or 75–80% doses of long- acting analog or pump basal insulin.
7. Ultra and Long-acting insulin DM1: Administer full dose* DM2: Administer 75-80% of daily dose
8. Monitor blood glucose while the patient is NPO and dose with short- or rapid-acting insulin as needed.
9. Preferably earlier cases to avoid hypoglycemia

* 80% if history of AM hypoglycemia

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Hyperglycemia in critically ill patients

The American Heart Association guidelines of post-cardiac arrest care for hyperglycemic control is to maintain a blood glucose level of 144 mg/dL to 180 mg/dL (Class IIb). A more liberal target of 180 mg/dL to 200 mg/dL is to be avoided to prevent marked hyperglycemia.

- Longstreth WT Jr., Cobb LA, et al. Neurologic outcome and blood glucose levels during out- of-hospital cardiopulmonary resuscitation. Neurology 1986; 36:1186.
- Skrifvars MB, Pettila V, Rosenberg PH, Castren M. A multiple logistic regression analysis of in-hospital factors related to survival at six months in patients resuscitated from out-of-hopital ventricular fibrillation. Resuscitation 2003; 59:319.
- 2016 American Heart Association Basic Life Support Provider Manual

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Decrease surgical site infections: A Perioperative Systems Design to Improve Intraoperative Glucose Monitoring Is Associated with a Reduction in Surgical Site Infections in a Diabetic Patient Population.

Jesse M. Ehrenfeld, M.D., M.P.H., Jonathan P. Wanderer, M.D., M.Phil., Maxim Terekhov, M.S., M.B.A., Brian S. Rothman, M.D., Warren S. Sandberg, M.D., Ph.D. **Anesthesiology 2017; 126:431-40**

Using an automatic system to identify diabetic patients, detect insulin administration, check for recent glucose measurements, and remind clinicians to check intraoperative glucose improved the reliability of intraoperative glucose management. After implementing this automated reminder system, improved glucose monitoring, increased insulin administration, reduced recovery room hyperglycemia, and fewer surgical site infections were observed.

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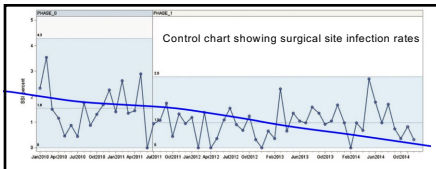
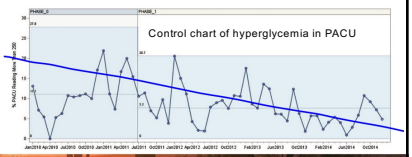


Intraoperative glucose monitoring rose from 61.6 to 87.3% in cases after intervention ($P = 0.0001$) d

More patients received intraoperative insulin after the intervention (30% before *vs.* 38% after; $P < 0.0001$)



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How much insulin do I use?

Correction factor = 1800/total daily dose of insulin: expected decrease in BG per one unit of insulin administered.

Example:

Patient takes 60 units of long acting & 10 units with each meal

90 units a day.

1800/90 = 20

For each unit administered the BG should be expected to decrease by 20 mg/dl

- BG is 250 > 250 – 140 = 110 / 20 = 5.5 units > 5 units
- Monitor patient accordingly to type of insulin used.

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Short-acting and Rapid Acting Insulin

Short Acting Insulin	**Human Regular (Novolin R, Humulin R):** subcutaneous 2-4 times daily before meals or to correct hyperglycemia	Onset: 30 min Peak: 2-3hrs Duration: 4-6hrs	Administer usual daily dose	Hold
Rapid Acting Insulin	**Insulin lispro (lispro, Admelog, Humalog 100, Humalog 200)** **Insulin aspart (Fiasp, Novolog)** **Insulin glulisine (Apidra):** subcutaneous 2-4 times daily before meals	Onset: 15 min Peak: 1-2 h Duration: <6 h ◦ Fiasp onset time = 2.5min	Administer usual daily dose	DM1: Can administer for hyperglycemia DM 2: Hold

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Semper imitatum, nunquam idem

Physician anesthesiologists are the perioperative medicine specialists who assess and modify risk factors to decrease complications and implement evidence-based medicine to decrease discharge time and postoperative visits to the ER and/or post-discharge hospitalizations.

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