

2014 Perioperative Glucose Control Best Practices

WRITING COMMITTEE MEMBERS

Rachel E Thompson MD MPH, Associate Professor, University of Washington Harborview Medical Center; Patricia Montgomery RN, Pre-Anesthesia Clinic, University of Washington Harborview Medical Center; Amber Theel, RN BSN MBA CPHQ CPHRM, Washington State Hospital Association; Jan Chow Pharm.D. BCPS, Clinical Specialist, PeaceHealth Southwest Medical Center; Sharon I. Eloranta MD, Medical Director, Qualis Health; E. Patchen Dellinger MD, Professor of Surgery, University of Washington Medical Center; Thérèse Franco MD, Hospital Medicine, Virginia Mason Medical Center; Cathy McDonald RN COHN CIC, Harrison Medical Center; Lauren Newcomer RN, CHI Franciscan Health; Sara Sherington PharmD, PeaceHealth Southwest Medical Center; Barbara Stimek BSN, Providence Regional Medical Center Everett; Jennifer Schneider PharmD BCPS, MultiCare Health System; Gail A. Van Norman MD, Professor, Anesthesiology and Pain Medicine, University of Washington Medical Center; Janice Whitman RN MSN CCRN CNS, Skagit Regional Health; Thomas K. Varghese Jr. MD MS FACS, Strong for Surgery; Carol Wagner RN MBA, Washington State Hospital Association.

Preoperative Period

In the weeks prior to surgery and on the morning of surgery

1.1 Preoperative Screening (prior to day of surgery)

- 1.1.a Check A1c in all patients with known diabetes within 90days of surgery
- 1.1.b Patients with an A1c of greater than 8.5 may benefit from further evaluation prior to elective surgery. A1c threshold alone should not be used to determine if a patient can proceed to surgery
- 1.1.c Consider checking fasting glucose or A1c in all patients at risk for diabetes or pre-diabetes (i.e. those with BMI \geq 30, those \geq 45 years old)

1.2 Day of Surgery Monitoring

- 1.2.a Check glucose on all patients with known diabetes on arrival the day of surgery.
- 1.2.b Check glucose on those at risk for perioperative hyperglycemia on arrival the day of surgery. BMI \geq 30 or those \geq 45 years old)

1.3 Glucose target

- 1.3.a Glucose on arrival on the day of surgery is $<180\text{mg/dL}$
- 1.3.b Glucose $\geq 180\text{mg/dL}$ alone is not a reason to cancel surgery; rather develop an institution protocol on how to monitor and manage glucose perioperatively for patients $\geq 180\text{mg/dL}$
- 1.3.c If acidemia or hyperosmolar in the setting of hyperglycemia, do NOT proceed with surgery unless urgent/emergent

1.4 Intervention

- 1.4.a Institutions should develop protocols for action for patients with glucose $>180\text{mg/dL}$
- 1.4.b Discuss plan to control intraoperative hyperglycemia prior to starting surgery on any patient whose glucose on arrival is $>100\text{mg/dL}$
- 1.4.c Develop a clear hypoglycemia protocol for this period

Intraoperative Period

From the start of surgery through end of case

2.1 Monitoring

2.1.a Check glucose following induction in all patients with diabetes or with initial day of surgery glucose >100mg/dL

2.1.b Consider rechecking glucose post incision to monitor for stress induced hyperglycemia or steroid induced hyperglycemia

2.2 Glucose target

2.2.a Goal intraoperative glucose 100-180mg/dL

2.2.b Consider goal of 100-150mg/dL in certain surgical types (i.e. cardiac surgery)

2.3 Intervention

2.3.a Treat with insulin to keep glucose <180mg/dL; insulin drip with frequent monitoring is the preferred method for intraoperative control when available within the institution

2.3.b Do NOT use sliding scale subcutaneous insulin in the intraoperative period

2.3.c Develop a clear hypoglycemia protocol for this period

Postoperative – Post Anesthesia Care Unit

From the arrival in PACU to transfer to inpatient unit or discharge

3.1 Monitoring

3.1.a Check glucose on arrival to PACU in all patients with any glucose >140mg/dL on the day of surgery

3.1.b Check glucose on arrival to PACU in all patients with a history of diabetes

3.1.c Consider checking glucose on arrival to PACU in any patient at risk for perioperative stress or stress induced hyperglycemia

3.1.d For any patient with a day of surgery glucose >140mg/dL continue to check glucose every hour while in PACU

3.2 Glucose target

3.2.a. Glucose 100-180mg/dL

3.2.b Consider goal of 100-150mg/dL in certain surgical types (i.e. cardiac surgery)

3.3 Intervention

3.3.a Continue insulin management if begun intraoperatively

3.3.b Develop transition protocol from insulin infusion to basal-bolus SQ insulin if infusion will not be continued on transfer to inpatient unit

3.3.c Develop a clear hypoglycemia protocol for this period

Postoperative – Inpatient Care

From the arrival on the inpatient unit until discharge

4.1 Monitoring

4.2.a Check blood sugar every six hours (or prior to meals and at bedtime) in all patients with a history of diabetes or who had any day of surgery glucose >140mg/dL

4.2.b Consider checking glucoses every six hours (or prior to meals and at bedtime) in all patients at risk for stress or steroid hyperglycemia

4.2 Glucose target

4.2.a Glucose 100-180mg/dL

4.2.b Consider goal of 100-150mg/dL in certain surgical types (i.e. cardiac surgery)

4.3 Intervention

- 4.3.a Stop home oral hypoglycemic agents or injectable anti-DM agents other than insulin
- 4.3.b Use available IV insulin infusion protocol or develop a basal/bolus insulin protocol for inpatient use
- 4.3.c Do NOT rely upon sliding scale insulin for glucose control
- 4.3.d Incorporate a clear hypoglycemia protocol into standardized insulin orders

Discharge

By the time of discharge

4.1 Monitoring

- 4.1.a Ensure patients with diabetes and those who experienced perioperative hyperglycemia have a working glucometer for home use
- 4.1.b Develop patient specific home monitoring recommendations

4.2 Glucose target (consistent with ADA outpatient recommendations)

- 4.2.a Pre-meal 70-130mg/dL
- 4.2.b All other glucoses <180mg/dL

4.3 Intervention

- 4.3.a Ensure patient education for all patients with perioperative hyperglycemia, prior to discharge to include topics: diet, monitoring, significance of hyperglycemia
 - 4.3.b Consider engaging a Certified Diabetes Educator in the discharge process
 - 4.3.c Develop clear and patient friendly discharge instruction sheet for patients with perioperative hyperglycemia to include information regarding: importance of glucose control perioperatively, frequency of home monitoring, home glucose targets, planned follow up, and what to do if glucose is out of range
 - 4.3.d Arrange follow up with primary care provider or another follow-up provider within 1 week of discharge to re-evaluate glucose control in all patients with perioperative hyperglycemia
 - 4.3.e Ensure summary of glucose control and goals are communicated to primary care provider and/or other follow-up provider
-