PERI-ANESTHESIA DIABETIC MANAGEMENT STRATEGIES

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Peri-anesthesia
Diabetic Management Strategies

Problem Statement:

- Hyperglycemia in the perioperative period is an independent marker of poor surgical outcomes (delayed wound healing, increased rate of infection, prolonged hospital stay, higher postoperative mortality).

- Hyperglycemia (greater than 140 mg/dl) is a frequent occurrence with a prevalence of 20 to 40% in the general surgery and 80 to 90% in the cardiac surgery population.

- The stress of surgery, anesthesia, and illness increases secretion of counter-regulatory hormones (cortisol, glucagon, growth hormone, catecholamines), which in turn causes decreased insulin secretion, increased insulin resistance, decreased peripheral utilization of glucose, increased lipolysis and proteolysis.

Opportunity for Improvement:

- Hence, achieving good glucose control during the perioperative period is associated with beneficial post-surgical outcomes.

- Patients should have their blood glucose levels measured in the perioperative holding area, as well as in the operating room according to departmental guidelines

- Please find enclosed an updated peri-anesthesia management strategy for diabetic medications

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Diabetic patient scheduled for OR procedure

Questions to patient:
(1) Do you have Nocturnal Hypoglycemia?
(2) Do you get hypoglycemic if you miss a meal?

NO to
(1) & (2)

YES to (1)
Nocturnal
Hypoglycemia

YES to (2)
Daytime
Hypoglycemia

Proceed to Table 1

Proceed to Table 2

Proceed to Table 3

Table 1: Peri-Anesthesia Strategies for Diabetic Patients **NOT** Prone to Hypoglycemia

Solitary Control Agents	Day prior to Procedure	Dose Adjustment for Early Case	Dose Adjustment for Later Case	Post-procedure
Oral Medications	**Take as regularly scheduled**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Non-Insulin Injectable Agents Symlin, Byetta, Victoza	**Take as regularly scheduled**	**Take as regularly scheduled**	**Hold AM Dose**	Resume when tolerating regular diet
Injectable Long-Acting Insulin Lantus (Glargine), Levemir (Detemir),	**Take as regularly scheduled**	**Hold until after case** The give % of dose	**Hold until after case** Then give % of dose	Resume when tolerating regular diet Give % of Dose
Intermediate Acting Insulin NPH,Humulin N, Novolin N	**Take as regularly scheduled**	**Hold until after case** Then give % of Dose	**Hold until after case** Then give % of Dose	Resume when tolerating regular diet Give % of Dose
Regular Insulin (RAIA) **Humalog, Apidra, Lispro**	**Take as regularly scheduled**	**Hold all scheduled doses**	**Hold all scheduled doses**	Resume when tolerating regular diet
Pre-Mixed Insulin: **Humulin 70/30 50/50, Novolin 70/30, Novolog70/30, Humalog 75/25 50/50**	**Take as regularly scheduled**	**Hold AM Dose OR** give calculated amount of long-acting insulin (70%) only	Hold AM Dose **OR** give calculated amount of long-acting insulin (70%) only	Resume when tolerating regular diet Give % of Dose based
Insulin Pump	**Continue regular dosing**	**Decrease to 80% of basal. (Sleep or sick day dose)** Consider stopping if case > 6 h. Joslin Diabetes consult. Pager 81708.	Decrease to 80% of basal. **(Sleep or sick day dose)** Watch for hypoglycemia. Consider stopping if case > 6 h. Joslin Diabetes consult. Pager 81708.	Resume when tolerating regular diet

Table 2: Peri-Anesthesia Strategies for **Nocturnal** Hypoglycemia Prone Diabetic Patients

Control Agent	Day prior to Procedure	Dose Adjustment for Early Case	Dose Adjustment for Later Case	Post-procedure
Oral Medications	**Take as regularly scheduled** Consider 50% dose if hypoglycemic	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Non Insulin Injectable Agents Symlin, Byetta, Victoza	**Take as regularly scheduled**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Injectable Long Acting Insulin Lantus (Glargine), Levemir (Detemir),	Regular AM Dose **70% PM dose**	**Hold AM Dose**	Hold AM Dose	Resume when tolerating regular diet Give % of Dose
Intermediate Acting Insulin NPH,Humulin N, Novolin N	Regular AM Dose **70% PM dose**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet Give % of Dose
Regular Insulin (RAIA): **Humalog, Apidra, Lispro**	**Take as regularly scheduled**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Pre-Mixed Insulin: **Humulin 70/30 50/50, Novolin 70/30, Novolog70/30, Humalog 75/25 50/50**	Regular AM Dose **70% PM dose**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet Give % of Dose
Insulin Pump	**Decrease to 80% of basal**	**Decrease to 80% of basal. (Sleep or sick day dose)** Consider stopping if case > 6 h. Joslin Diabetes consult. Pager 81708.	Decrease to 80% of basal. **(Sleep or sick day dose)** Watch for hypoglycemia. Consider stopping if case > 6 h. Joslin Diabetes consult. Pager 81708.	Resume when tolerating regular diet

Table 3: Peri-Anesthesia Strategies for **Daytime** Hypoglycemic Prone Diabetic Patients

Control Agent	Day prior to Procedure	Dose Adjustment for Early Case	Dose Adjustment for Later Case	Post-procedure
Oral Medications	**Take as regularly scheduled**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Non Insulin Injectable Agents Symlin, Byetta, Victoza	**Take as regularly scheduled**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Injectable Long Acting Insulin Lantus (Glargine), Levemir (Detemir),	Regular AM Dose **70% PM dose**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet Give % of Dose
Intermediate Acting Insulin NPH,Humulin N, Novolin N	Regular AM Dose **70% PM dose**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet Give % of Dose
Regular Insulin (RAIA): **Humalog, Apidra, Lispro**	**Take as regularly scheduled**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet
Pre-Mixed Insulin: **Humulin 70/30 50/50, Novolin 70/30, Novolog70/30, Humalog 75/25 50/50**	Regular AM Dose **70% PM dose**	**Hold AM Dose**	**Hold AM Dose**	Resume when tolerating regular diet Give % of Dose
Insulin Pump	**PM Decrease to 80% of basal**	**Decrease to 80% of basal. (Sleep or sick day dose)** Consider stopping if case > 6 h. Joslin Diabetes consult. Pager 81708.	Decrease to 80% of basal. **(Sleep or sick day dose)** Watch for hypoglycemia. Consider stopping if case > 6 h. Joslin Diabetes consult. Pager 81708.	Resume when tolerating regular diet

Day-of-surgery adjustment of single peakless or intermediate-acting insulin

$$\frac{[\text{Dosing interval (h)} - \text{Hours of fast during interval}]}{\text{Dosing interval (h)}} = \text{Fraction of insulin to give}$$

- Example: Adult patient undergoing carpal tunnel release under block with sedation. Estimated to be eating normally by 10 AM.
- Patient usually takes 1 dose of 32U of injectable long-acting insulin at 7AM daily
- Dosing interval is 24 hours. Time of fast is 3 hours.
- Calculation: (24-3)/24 = 21/24
- Patient receives 7/8 ths of usual dose = 28 U

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- Point-of-care (POC) capillary blood glucose (BG) meters are commonly used in hospitals.
- Testing should take place in preoperative holding area, and then every 1 to 2 hours during the perioperative period.
- No particular BG value necessarily warrants treatment or cancellation of surgery.
- Ideally patients should have a HA1C level of < 8 prior to surgery
- Factors that may affect perioperative POC capillary BG measurements include:
  - Hypoglycemia (Meter may overestimate BG level)
  - Oxygen administration
  - Acetaminophen
  - Hypotension, use of vasopressors
  - Anemia
  - pH changes
  - Active warming or cooling
  - Vitamin C excess

Diabetic Management
References

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