

GUIDELINE AND ADHERENCE EVALUATION FOR THE PRE-OPERATIVE MANAGEMENT OF ADULT PATIENTS WITH TYPE II DIABETES



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BACKGROUND

There is a clear association between elevated blood glucose (BG) in the pre-operative period and adverse clinical outcomes including post-operative complications such as increased hospital length of stay and increased mortality in surgical patients. Surgical stress and anesthesia can cause metabolic consequences due to altered hepatic glucose production and an increase in counterregulatory hormones. Many of these patients manage their diabetes with long acting, 70/30 mixed, or NPH insulins, and they require special management of their insulin(s) in the pre-operative period.

PURPOSE

An evaluation of The University of Kansas Health System's (TUKHS) guideline for the perioperative management of adult patients with Type II diabetes undergoing a procedure was completed to determine the appropriate use and adherence to said guidelines both in the Pre-Operative Assessment Clinic (PAC) and the Post-Anesthesia Care Unit (PACU). The results of this evaluation will guide education to providers and pharmacists if needed and determine if changes to the guidelines need to be made.

METHODS

Study design: Retrospective chart review

Time frame: January 1, 2020 – December 31, 2020

Inclusion Criteria:

- Type II diabetic patients undergoing a procedure involving sedation/anesthesia at Main or Indian Creek Campus
- Patient prescribed long acting (glargine, detemir, degludec), 70/30, or NPH insulin
- Seen in the Pre-Operative Assessment Clinic (PAC) prior to procedure

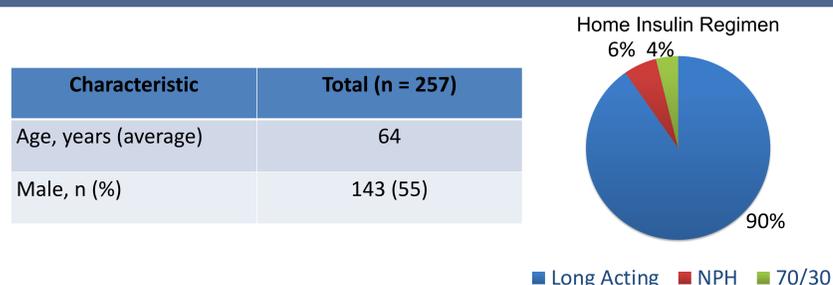
Exclusion Criteria:

- Patients that are on any kind of insulin other than the 3 previously listed
- Type I diabetic patients and/or patients using insulin pumps
- Patients receiving Tresiba BID
- Patients undergoing a bowel preparation the day prior to surgery
- Patients < 18 years of age

Data Collected:

- Patient demographics (gender, age)
- Home insulin regimen
- Insulin instructions given in PAC per Perioperative Diabetes Guidelines
- Blood glucose(s) prior to procedure start time
- Insulin given prior to procedure (Y/N)
- Type, dose, and route (IV/SQ) or insulin given prior to procedure start time, if any
- Cancellation of procedure due to elevated blood glucose (Y/N)

PATIENT DEMOGRAPHICS



METHODS

PAC pre-operative insulin recommendations

Day Before Surgery Insulin Regimen

Day before surgery insulin regimen	Glargine, Detemir, Degludec		NPH or 70/30 Insulin	
	AM Dose	PM Dose	AM Dose	PM Dose
Normal diet or Bowel prep (and/or liquids only 12-24 hours prior to surgery)	Usual dose	80% usual dose	80% usual dose	80% usual dose

Day of Surgery Insulin Regimen

Day of Surgery Insulin Regimen	Glargine, Detemir, Degludec	NPH insulin	70/30 Insulin
Insulin or noninsulin injectable dose	80% of usual dose if patient uses morning only or twice daily basal	50% usual dose	Hold 70/30. Contact OR pharmacy to dispense 50% NPH dose (or 35% total insulin dose) as NPH

Hospital recommendations for pre- and intra-operative blood glucose > 180 mg/dL

Subcutaneous insulin correction factor dosing*

Blood glucose (mg/dL)	Insulin sensitive (Age > 70, GFR < 45mL/min, no history of DM)	Standard insulin dosing (Most patients)	Insulin Resistant (BMI > 35kg/m ² , Home TDD insulin > 80 units, steroids > 20mg prednisone daily)
181-220 mg/dL	1 unit	2 units	4 units
221-260 mg/dL	2 units	4 units	8 units
261-300 mg/dL	3 units	6 units	12 units
301-350 mg/dL	4 units	8 units	16 units
351-400 mg/dL	5 units	10 units	20 units
> 400 mg/dL	6 units	12 units	24 units

Adapted from Duggan et. al 2017

*If the patient falls into more than one insulin treatment group, choose the category with the lowest correctional dose to minimize the risk of hypoglycemia

RESULTS

257 patients met inclusion criteria and were evaluated as part of this review

PAC guideline adherence:

- 235 of 257 patients (91.4%) were given appropriate written pre-operative insulin administration recommendations based on the established TUKHS policy.
- 22 patients (8.6%) received insulin administration recommendations outside of established guidelines



RESULTS

PACU guideline adherence:

- 53 of 257 (20.6%) patients arrived on day of surgery with BG > 180 mg/dL
 - 7 (13.2%) patients received insulin
 - 46 (86.8%) patients had no documented insulin administration prior to surgery

Characteristic	Total (n= 7)
Appropriate dose of insulin given per TUKHS policy, n (%)	2 (28.6)

- For patients with BG > 180 mg/dL, BG ranged from 185-388 mg/dL

CONCLUSIONS

- Pharmacists in the PAC gave appropriate pre-operative insulin administration instructions for the majority of patients.
 - 1/5 of patients that received accurate instructions had a BG >180 on day of surgery.
- The majority of patients with BG > 180 mg/dL prior to their procedure were not given insulin.
- If insulin was administered, most patients were given a dose that did not correlate with the established policy.
- All patients were given an appropriate type of insulin (rapid acting or regular) and were given insulin via the appropriate route (IV or SQ).

FUTURE DIRECTIONS

Results of this study will be provided to PAC and PACU staff for review. Upon discussion of these results with both PAC and PACU staff, it will be determined whether or not modifications of the current guideline in place at TUKHS need to be made. If deemed necessary, education of pharmacists and providers regarding potential guideline changes will be done in order to provide quality care for this patient population.

STUDY LIMITATIONS

- Retrospective chart review
- Reliance on physician/nurse/pharmacist documentation
- Unable to validate patient adherence to pre-operative insulin instructions given by pharmacists in PAC
- Poor outcomes due to peri-operative hyperglycemia was not assessed in this study
- Established guidelines were made for patients with controlled Type II Diabetes, and not all patients included in this study may not have been controlled prior to PAC visit

REFERENCES

Duggan, E.W., Carlson, K., & Umpierrez, G.E. (2017). Perioperative hyperglycemia management: An update. *Anesthesiology*, 126(3), 547-560.

The University of Kansas Health System. (2020). Management of the Adult Patient with Diabetes Undergoing a Procedure policy. Kansas City, KS.

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