

# Should Insulin be Withheld When Nothing by Mouth is Ordered in Patients Who Require Insulin?

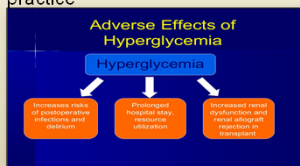
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## BACKGROUND

- Physicians frequently hold patients' previous outpatient anti-diabetes regimen and initiate sliding scale insulin (SSI) coverage with regular insulin, a practice associated with sub-optimal glycemic control. (Moghissi et al., 2007)
- Patients with Type 1 diabetes completely lack endogenous insulin production, affecting a need for continuous exogenous basal insulin while fasting, to prevent gluconeogenesis and ketone production. Many patients with Type 2 diabetes are insulin deficient.
- Nurses frequently withhold patients' insulin for scheduled procedures while NPO
- Fear of hypoglycemia, clinical inertia, and medical errors are major barriers to achieving optimal blood glucose control. (Moghissi et al., 2007)
- Clinical guidelines are not translated into clinical practice



## THE PURPOSE

(Moghissi et al., 2007)

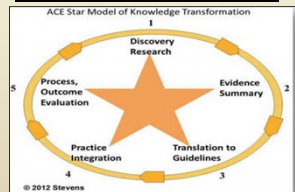
The study was to perform comparative analysis of practice guidelines and current evidence for the management of hyperglycemia in hospitalized patients

## METHODS

An integrative literature review was conducted using Cochrane, CINAHL Plus, PubMed and the National Guideline Clearing House. Key words searched included hyperglycemia, inpatient diabetes, pre-operative, surgical, NPO, hospitalized, Type 1, Type 2 diabetes.



## THEORETICAL FRAMEWORK



## DEFINITIONS

- Basal- a constant source of insulin to maintain blood glucose levels while fasting. Suppresses gluconeogenesis and ketogenesis

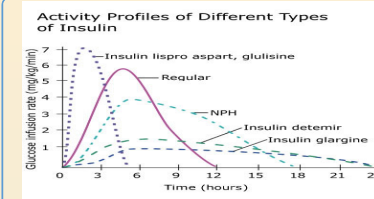
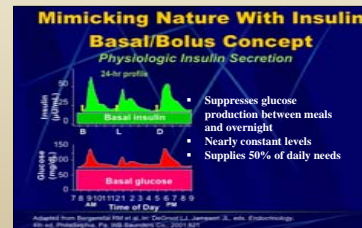
- Bolus (Prandial/meal time) a fast acting insulin given at meal time to prevent hyperglycemia (hold if NPO)
- Correction-should not be confused with "sliding scale insulin". Should be customized to match insulin sensitivity for each patient. Based on weight or total daily insulin requirement (AHRQ 2012)

Table 2: Correctional insulin protocol

BG (mg/dL)	Insulin-sensitive	Usual	Insulin-resistant
100-140	0	0	0
>141-180	2	4	6
181-220	4	6	8
221-260	6	8	10
261-300	8	10	12
301-350	10	12	14
351-400	12	14	16
>400	14	16	18

[http://www.jgim.org/July\\_2014\\_special\\_issue/01\\_consensus\\_evidence\\_based.html](http://www.jgim.org/July_2014_special_issue/01_consensus_evidence_based.html)

- Sliding Scale- refers to a set amount of insulin administered for hyperglycemia without regard to the timing of food, Presence or absence of pre-existing insulin administration, or individualization of patient's sensitivity to insulin.
- Intensive Control- an attempt to mimic the body's normal pattern of insulin secretion to achieve tighter glucose control.



## RESULTS

### Systematic Reviews/Practice Guidelines(n=4)

- Insulin therapy is the preferred method for achieving glycemic control in hospitalized patients.
- All patients with diabetes treated with insulin at home should be treated with a scheduled subcutaneous insulin regimen in the acute care setting.
- For patients who are not eating, basal insulin is continued once daily (glargine or detemir) or twice daily (detemir/neutral protamine) Hagedorn(NPH) plus correction doses of a rapid insulin analog (aspart, lispro, glulisine) or regular insulin every 4-6 hours as needed. Withhold mealtime insulin. (AHRQ, 2012)
- Joshi et al., 2010, concur with AHRQ guidelines of 2012. However, overall studies evaluating perioperative patients with diabetes are sparse and of limited quality. Recommendations were based upon general principles of blood glucose control in diabetics, drug pharmacology, data from inpatient surgical population, review articles, as well as clinical experience and judgement.

- Prolonged use of sliding scale insulin (SSI) therapy be avoided as the sole method for glycemic control in hyperglycemic patients with history of diabetes during hospitalization.

Insulin Regimen	Day before Surgery	Day of Surgery	Comments
Insulin pump	No change	No change	Use "sick day" or "sleep" basal rates
Long-acting, Peakless Insulins	No change	75%-100% of morning dose	Reduce nighttime dose if history of nocturnal or morning hypoglycemia
Intermediate-acting insulins	No change in the daytime dose 75% of dose if taken in the evening	50%-75% of morning dose	See the comments for long-acting insulins
Fixed combination insulins	No change	50%-75% of morning dose of intermediate-acting component	Lispro-protamine only available in combination; therefore use NPH instead, on day of surgery
Short and rapid-acting insulins	No change	Hold the dose	
Noninsulin injectables	No change	Hold the dose	(Joshi et al., 2010)

## Single Randomized Control Trial (n=1)

- Treatment with insulin glargine and glulisine resulted in significant improvement in glycemic control compared with that achieved with the use of sliding scale alone.

## CONCLUSION

A basal insulin plus correction regimen is the preferred treatment for non-critically ill patients, not eating or drinking. The implementation of standardized insulin order sets require key concepts promoting the use of basal and correction/sliding scale insulin while the patient is NPO, preventing the single use of sliding scale (Maynard et al, 2008). The above interventions are key to reducing complications associated with severe hyperglycemia and hypoglycemia in hospitalized patients.