4-16-2024

Insulin Prescribing and Glycemic Control in Response to a Steroid-Induced Hyperglycemia Best Practice Alert

Nicole Bullock

Anna Eursiriwan

Kevin Szyskowski

Insulin Prescribing and Glycemic Control in Response to a Steroid-Induced Hyperglycemia Best Practice Alert

Nicole Bullock, PharmD, Anna Eursiriwan, PharmD, Kevin Szyskowski, RPh

Henry Ford Jackson Hospital

Abstract

The American Diabetes Association (ADA)recommends intermediate-acting insulin NPH or long-acting insulin glargine for steroid-induced hyperglycemia in patients with diabetes mellitus (DM).[1] At Henry Ford Jackson Hospital (HFJH), methylprednisolone is associated with a high incidence of hyperglycemia. HFHS implemented a Steroid-Induced Hyperglycemia Best Practice Alert (BPA) to prompt insulin prescribing (NPH or glargine) in patients with recent hyperglycemia (BG >200 within 24 hours) and a new steroid order.

This observational retrospective cohort study included adult patients admitted to HFJH who were initiated on a corticosteroid within 24 hours of having a documented episode of hyperglycemia (blood glucose (BG) > 200 mg/dL). Vulnerable populations and patients with an active insulin order at the time of the BPA were excluded.

The primary outcome is the frequency of insulin prescribing in response to the BPA. Secondary outcomes are average time to insulin ordering after the alert, type of insulin regimen prescribed, and the difference in average BG between patients whose prescribers ordered insulin in response to the BPA (responder group) versus patients whose prescribers did not (non-responder group). Safety outcomes include the incidence of steroid-associated adverse drug events and hypoglycemia. Data was analyzed using descriptive statistics.

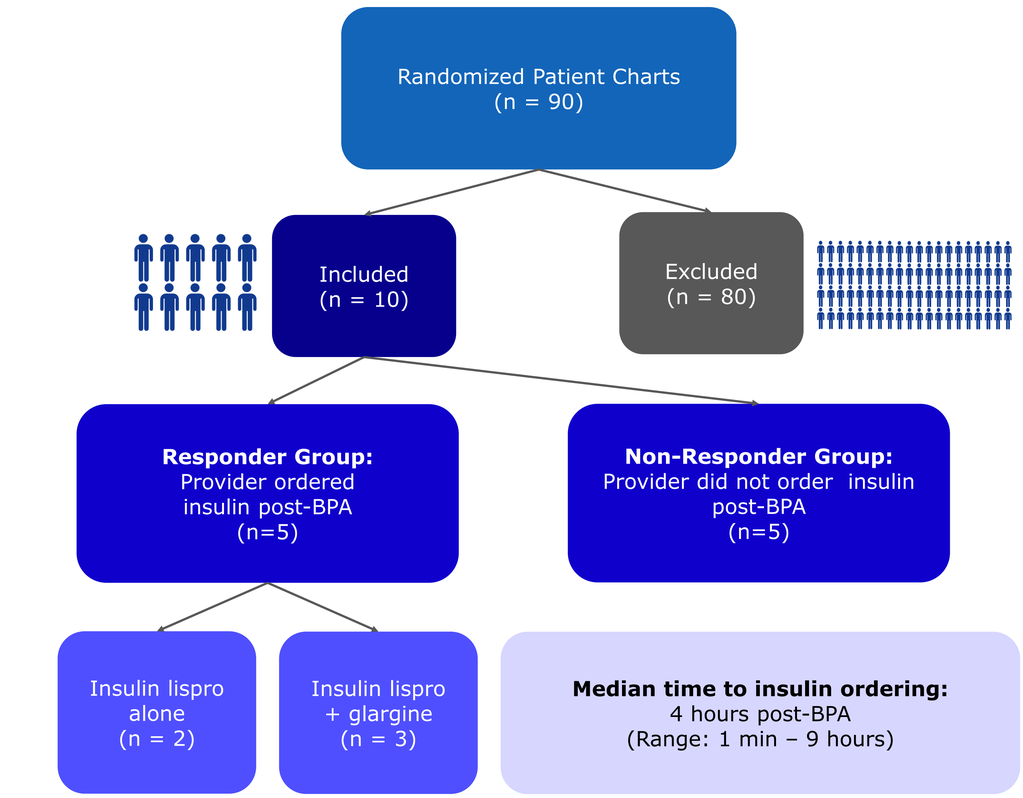
Ninety cases were reviewed. Ten patients met inclusion criteria and 80 were excluded due to having an active insulin order at the time of the BPA. Of the ten patients included, five were in the responder group and five were in the non-responder group. All five patients in the responder group had insulin lispro ordered, and three of the five had insulin glargine ordered in addition. The median time to insulin prescribing post-BPA was four hours. Patients' average BGs in the responder group was 260 vs. 147 in the non-responder group. No patients in either group experienced adverse drug events or hypoglycemia.

Overall, the Steroid-Induced Hyperglycemia BPA order set is not widely used at HFJH. Providers at HFJH were more likely to utilize the "Glycemic Control Protocol" order set, which includes insulin lispro as the default insulin order.

Methods

- Observational, single-center, retrospective cohort study utilizing medical chart (Epic ©) reviews of patients
- Inclusion Criteria:
  - Adult inpatients age ≥ 18 years
  - Treated at HFJH between 8/1/2022 and 8/1/2023
  - Patient's prescriber received a Steroid-Induced Hyperglycemia BPA
- Exclusion Criteria:
  - Patients ≤ 18 years
  - Pregnant patients
  - Residents of correctional facilities
  - Patient has any insulin ordered prior to corticosteroid order
- Patients divided into responder (provider ordered insulin after BPA) vs. non-responder (provider does not order insulin after BPA) groups
- Outcomes assessed using descriptive statistics

Results



Baseline Characteristics			
	All Patients (n=10)	**Responder Group (n=5)**	**Non-Responder Group (n=5)**
Age – Mean ± SD	61 ± 18	65 ± 19	56 ± 18
Female (%)	5 (50)	4 (80)	1 (20)
White, Non-Hispanic (%)	10 (100)	5 (100)	5 (100)
Type 2 Diabetes (%)	6 (60)	4 (80)	2 (40)
Steroid Prescribed (%)			
Dexamethasone IV	1 (10)	0	1 (20)
Methylprednisolone IV	6 (60)	4 (80)	2 (40)
Methylprednisolone PO	1 (10)	1 (20)	0
Prednisone PO	2 (20)	0	2 (40)
Outcomes			
Average Post-BPA BG (mg/dL) ± SD	189 ± 97	260 ± 65	147 ± 14
Steroid-Associated Adverse Event (other than hyperglycemia)	0	0	0
Hypoglycemia	0	0	0

Objective

- Measure the frequency insulin is ordered from a Steroid-Induced Hyperglycemia BPA order set.

Endpoints

- Primary Outcome: Frequency of insulin ordered from order set in response to a Steroid-Induced Hyperglycemia BPA
- Secondary Outcomes:
  - Median time to insulin ordering after the BPA
  - Patterns of insulin prescribing
  - Difference in average BG between patients in the responder vs. non-responder group
- Safety Outcomes:
  - Incidence of steroid-associated adverse drug events (other than hyperglycemia)
  - Hypoglycemia (BG < 70 mg/dL)

Conclusions

- Most patients were excluded because sliding scale insulin was prescribed prior to the BPA as a part of an active Glycemic Control Protocol order set
- The most common insulin prescribed was insulin lispro. Insulin glargine was prescribed if it was a patient's home medication.
- Overall, this BPA and its order set is underutilized. Providers did not order long-acting or intermediate-acting insulin using the order set attached to the BPA.
- The average BG was lower in the non-responder group. However, this group also had comparatively fewer BG checks and fewer patients with Type 2 diabetes.

Limitations:

- Small sample size due to stringent exclusion criteria.
- Patients who did not receive insulin had fewer BG checks compared to those who did receive insulin.

References

1. American Diabetes Association Professional Practice Committee. 16. Diabetes Care in the Hospital: Standards of Medical Care in Diabetes—2022. Diabetes Care. 2021; 45(Supplement_1):S244-S253. doi:10.2337/dc22-S016
2. Sampling Chapter TJC (v2022A1). Accessed August 30, 2023. https://manual.jointcommission.org/releases/TJC2022A1/SamplingChapterTJC.html