

# Decreasing Neonatal Postoperative Hyperglycemia – A Quality Improvement Project

Zhaohui Hu MD<sup>1</sup>, Alissa D Doll MD<sup>1</sup>, Katie A Liu MD<sup>1</sup>, Vedanta Dariya MD<sup>2</sup>, Jami E Miller MD<sup>1</sup>

<sup>1</sup>Department of Pediatric Anesthesiology and <sup>2</sup>Department of Pediatrics, UT Southwestern Medical Center/Children's Health, Dallas, Texas

## BACKGROUND

Hyperglycemia in critically ill infants is correlated with increased morbidity and mortality resulting in longer intensive care unit (ICU) and hospital length of stay. It also has potential long-term effects on growth, cardiac and neurodevelopment.

A trend of hyperglycemia was noted in our neonatal intensive care (NICU) population after receiving anesthetic care for procedures.

**Aim:** To reduce incidence of hyperglycemia (>200 mg/dL) in the neonatal population through education and modification to perioperative glucose management.

## METHODS

We conducted a quality improvement project involving the anesthesia and NICU teams.

Baseline data were collected via chart review from January to June 2019. Multiple interventions were implemented over time with continuous data collection starting in January 2020 then monthly thereafter. Excluding imaging studies with sedation, all NICU patients undergoing general anesthesia were included in the study.

**Primary outcome:** Occurrence of postoperative hyperglycemia in NICU patients after receiving anesthesia.

## RESULTS

Overall, the incidence of postoperative hyperglycemia decreased over time except for the year of 2021 with very rare occurrence of hypoglycemia.

	Post-op Hyperglycemia	Post-op Hypoglycemia
2019 (Jan-June) - Baseline	20.9% (32)	0.1% (1)
2020	11.2% (29)	0.4% (1)
2021	16.9% (46)	0% (0)
2022	8.7% (24)	0% (0)
2023 (Jan-Feb)	0% (0)	0% (0)

Table 1. Incidence of hyperglycemia and hypoglycemia by calendar year

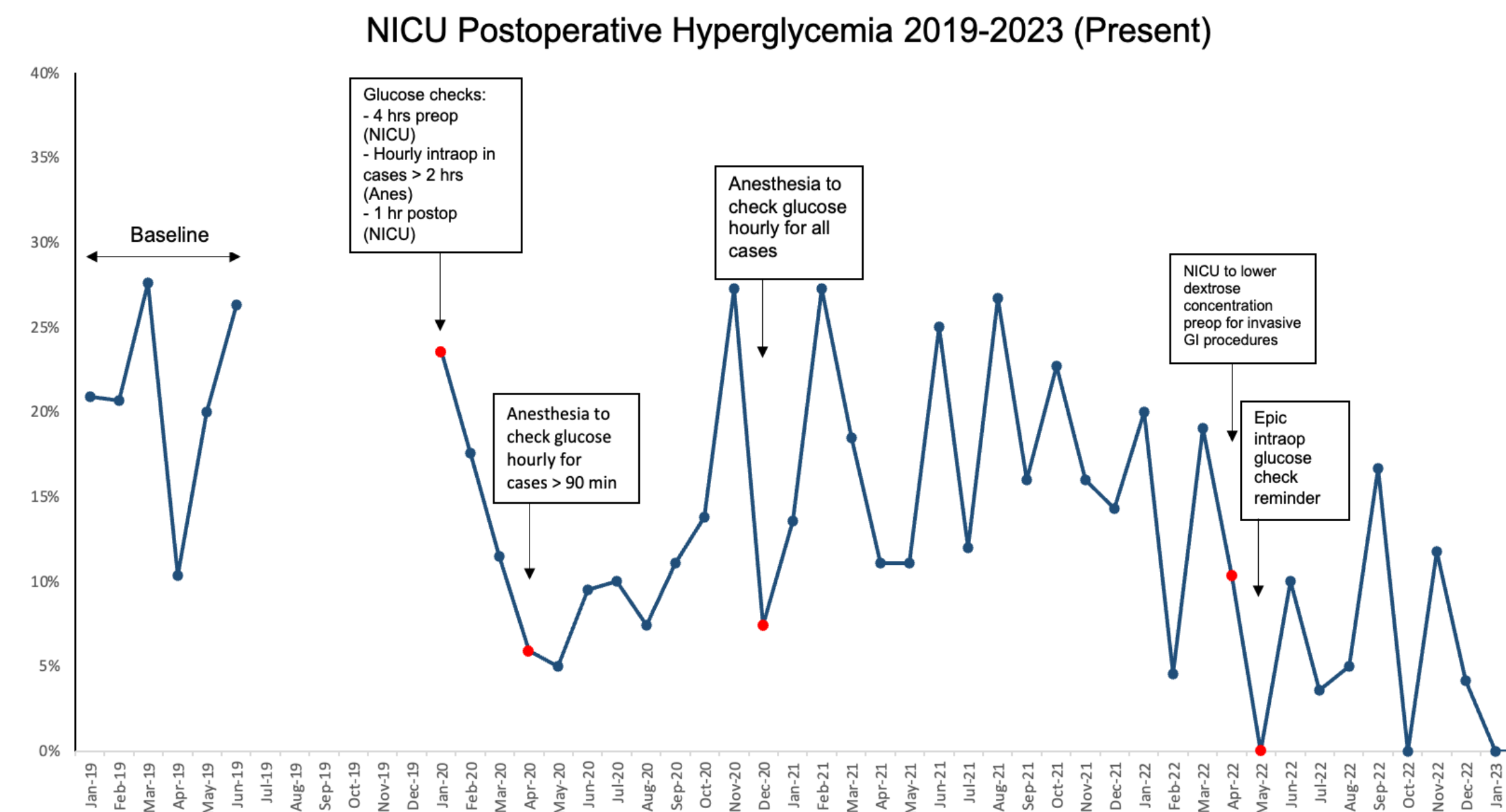


Figure 1. Incidence of hyperglycemia by month

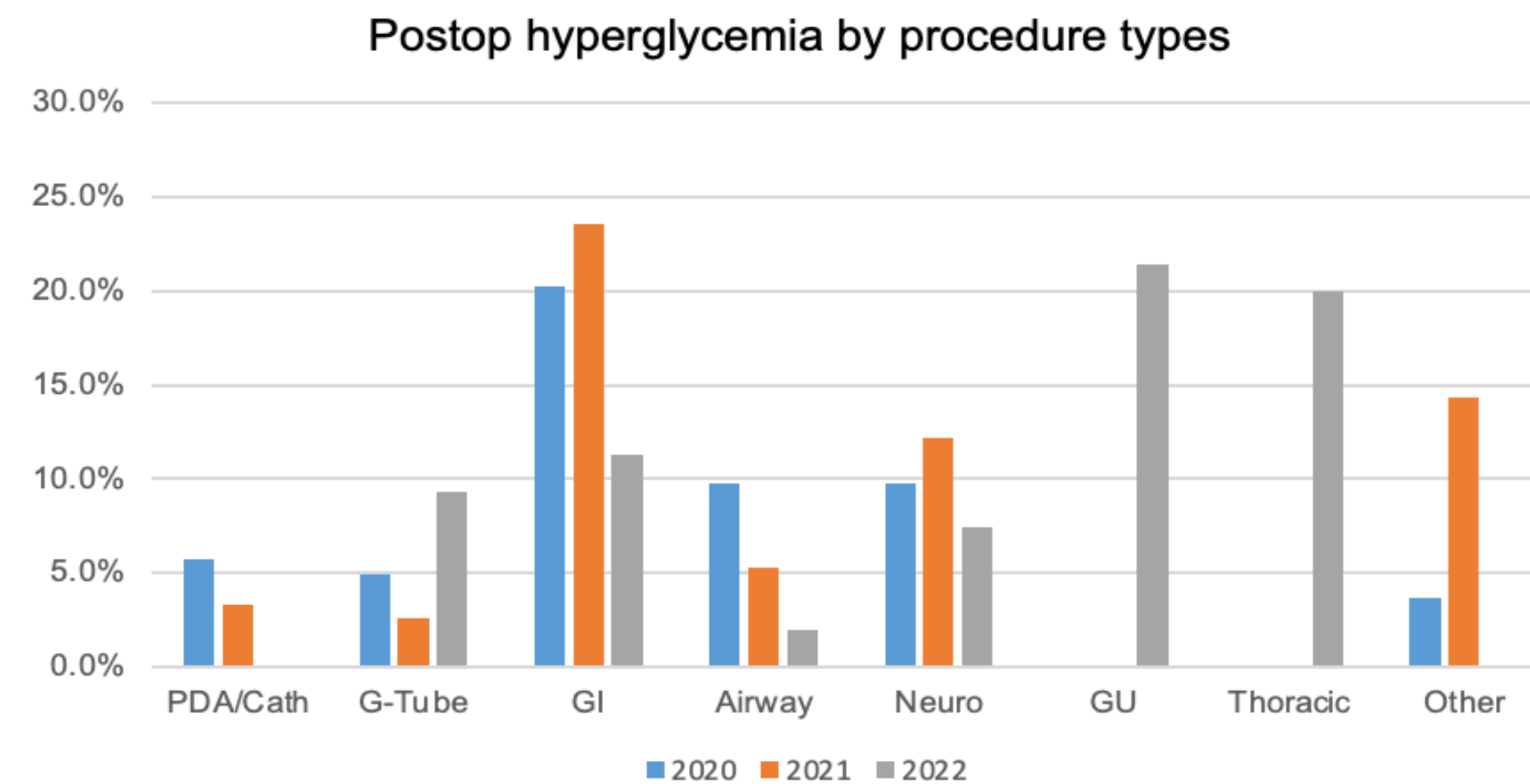


Figure 2. A much higher incidence of hyperglycemia was noted in invasive GI surgeries (20.3% in 2020, 23.5% in 2021) making up 51% and 70% of all hyperglycemic cases for 2020 and 2021 respectively

Literature has found that glucose infusion rate (GIR) is a modifiable risk factor for postoperative hyperglycemia. Starting in April 2022, D10 containing fluids were changed to D7.5 or D5 for invasive GI procedures if NICU patients' weight > 1.5 kg.

In collaboration with the NICU and pediatric endocrinology colleagues, a new hyperglycemia management guideline for NICU patients were introduced to the Pediatric Anesthesia division as the newest PDSA cycle starting in March 2023.

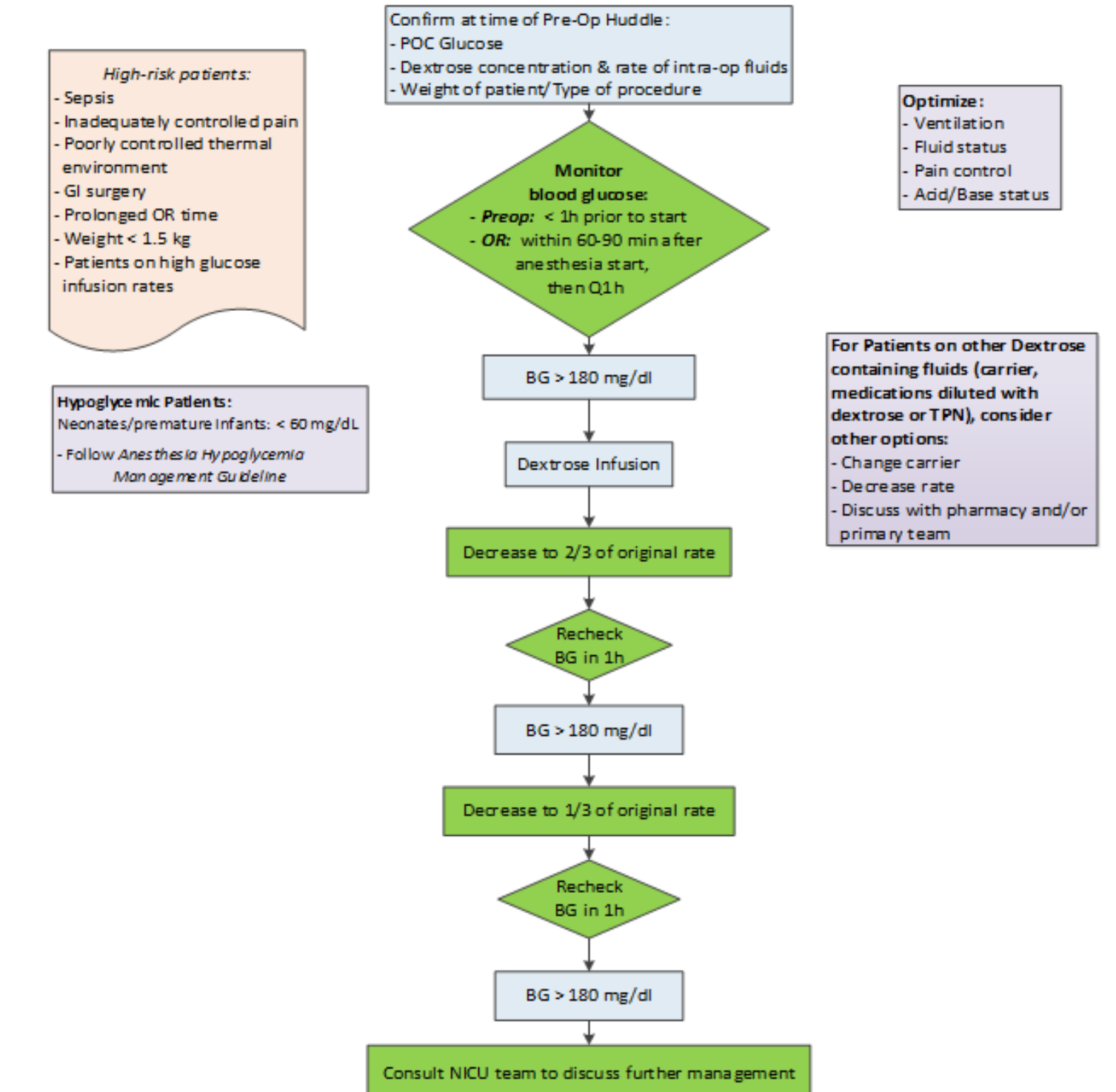


Figure 3. Perioperative hyperglycemia management guideline

## DISCUSSION

- The cause of postoperative hyperglycemia is multifaceted
- Uptick of hyperglycemia in late 2020 to 2021 due to COVID-related nursing staff shortage and increase in invasive GI procedures
- Our data showed that, with implementation of interventions, there was an overall decrease in postoperative hyperglycemia in NICU patients
- We will continue to identify key barriers to achieving post-op normoglycemia and adjust our guideline to facilitate care

## CONCLUSION

- Close glucose monitoring, adjustment of GIR and education of care teams were associated with a decreased incidence of postoperative hyperglycemia in the NICU population

## References

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