



# Risk factors for perioperative hypoglycemia in children: A retrospective study



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## Background

Perioperative hypoglycemia in children can result in devastating neurologic injury if not promptly diagnosed and treated. Few studies have defined risk factors for perioperative hypoglycemia. The authors sought to characterize children who have hypoglycemia in the perioperative period and determine independent risk factors for perioperative hypoglycemia in children.

## Methods

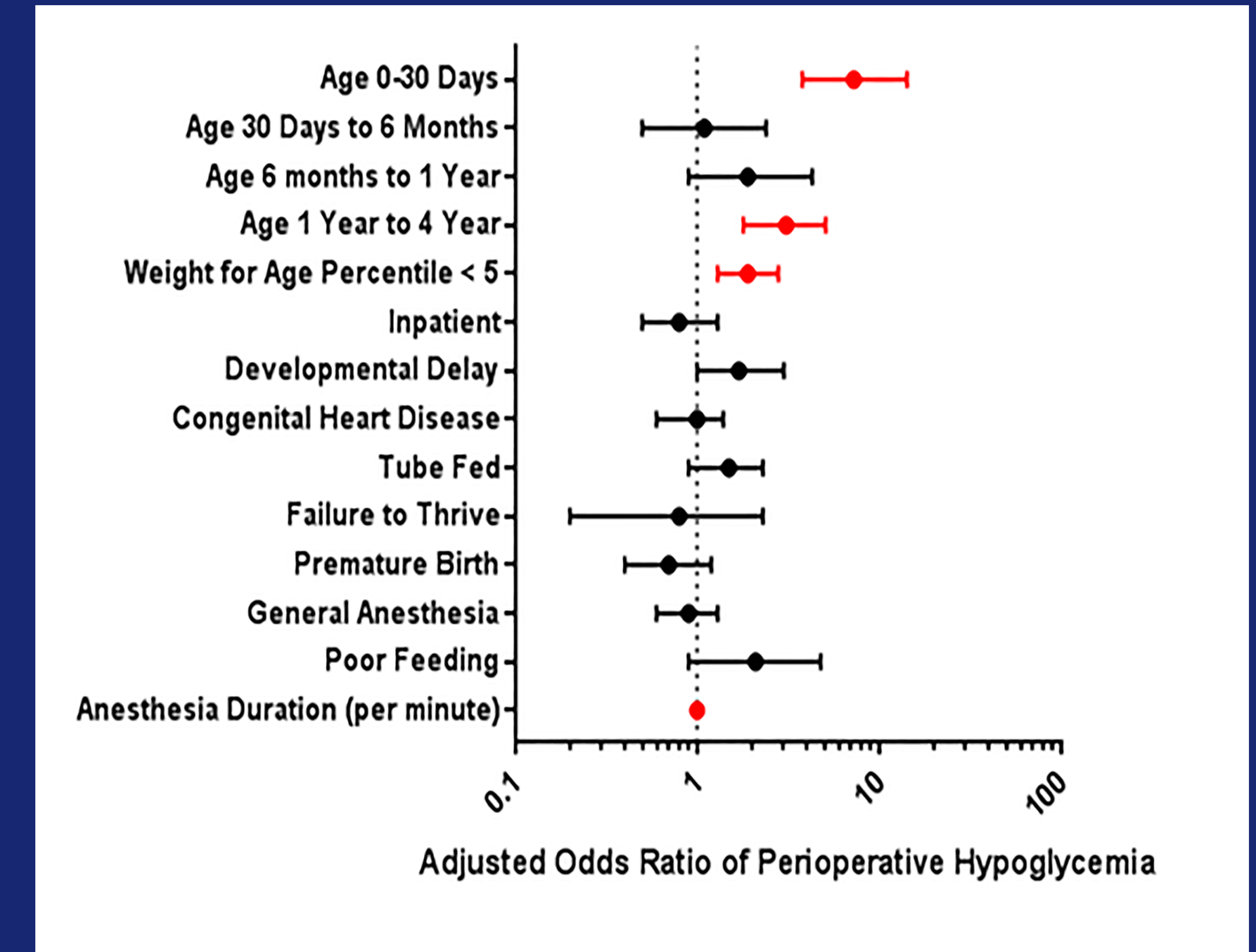
This retrospective observational single-institution study included all patients < 18 years from January 1, 2012 to December 31, 2016 who had at least one blood glucose measured perioperatively. The primary outcome was hypoglycemia defined as blood glucose less than 60 mg/dl. Data collected included patient demographics, illnesses, failure to thrive, type and duration of anesthesia. A multivariable logistic regression model was used to identify independent predictors ( $p < 0.05$ ) of perioperative hypoglycemia.

## Results

Blood glucose was measured in 10,077/82621 cases with 169 having a glucose < 60 mg/dl. Factors associated with perioperative hypoglycemia in children included young age, low weight, less than 5th percentile weight for age, presence of a feeding tube, poor feeding, congenital heart disease and developmental delay. Eighty percent of hypoglycemic events occurred in children < 4 years of age and in those < than 15 kg. Young age and weight < 5th percentile for age were identified as independent predictors for perioperative hypoglycemia in children.

	No Perioperative Hypoglycemia < 60 (N = 9,908)	Perioperative Hypoglycemia < 60 (N = 169)	P-Value
Age (years)	3.1 [0.4 to 10.6]	1.5 [0.0 to 3.4]	<0.001
Female Sex	4,664 (47.1%)	73 (43.2%)	0.582
Height (cm)	105.4 [71.1 to 147.3]	83.8 [68.6 to 101.6]	<0.001
Weight (kg)	14.3 [6.2 to 33.8]	8.9 [3.6 to 13.0]	<0.001
Weight for Age Percentile < 5	2,356 (24.6%)	62 (38.0%)	<0.001
Height for Age Percentile < 5	1,626 (27.4%)	36 (44.4%)	0.001
Inpatient	3,885 (39.2%)	81 (47.9%)	0.021
Premature Birth	1,653 (21.8%)	37 (26.4%)	0.192
Diabetes	355 (3.6%)	0 (0.0%)	0.005
Hypoglycemia	133 (1.4%)	4 (2.4%)	0.292
Developmental Delay	690 (7.0)	20 (11.8%)	0.022
Heart Failure	1,189 (12.1%)	20 (12.1%)	0.999
Congenital Heart Disease	4,276 (43.4%)	89 (53.3%)	0.011
Poor Feeding	302 (3.1%)	12 (7.2%)	0.002
Malabsorption Disease	475 (4.8%)	9 (5.4%)	0.714
Tube Fed	1,353 (13.9%)	40 (24.7%)	<0.001
GERD	912 (9.4%)	13 (7.9%)	0.591
Failure to Thrive	243 (2.5%)	8 (4.9%)	0.071
Recent URI or Pneumonia	543 (5.6%)	13 (7.9%)	0.230
General Anesthesia	6,660 (67.2%)	102 (60.4%)	0.060
Anesthesia Duration (min)	226.0 [131.0 to 343.0]	205.0 [131.0 to 291.0]	0.039

Table 1. Univariate comparisons between those with and without a perioperative hypoglycemia event.



Forest plot of adjusted odds ratios for the outcome of intraoperative hypoglycemia. Red indicates statistical significance. The reference group for age is 4+ years. The model c-statistic was 0.73.

## Discussion

Young age and less than 5th percentile weight for age are independent risk factors for perioperative hypoglycemia in children. Monitoring of blood glucose and judicious dextrose administration may be warranted in these subsets of children.

## References

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