University of Iowa Stead Family Children's Hospital

Neonatology Clinical Practice Guidelines

NICU Glucagon Infusion Guidelines

Therapeutic use: Glucagon infusions are occasionally used in newborns with persistent hypoglycemia defined as blood glucose < 50 mg/dL while on maximum dextrose infusion. Severe hypoglycemia requiring high glucose infusion rates are associated primarily with infants with intrauterine growth restriction, small for gestational age, perinatal asphyxia, sepsis, or most frequently, diabetic mothers (IDM). Unremitting hypoglycemia requiring prolonged IV dextrose infusions for more than 7 days is seen with congenital hyperinsulinism and persistent hyperinsulinemic hypoglycemia of infancy (PHHI), previously known as Nesidioblastosis.

Background: Induction of endogenous glucagon secretion from pancreas cells as a counterregulatory hormone of insulin occurs naturally in the setting of hypoglycemia. Infants born to diabetic mothers secrete higher amounts of insulin to help accommodate for the excess fetal glucose. Glucagon infusions have been used in neonates to elevate serum glucose concentrations in patients with persistent hypoglycemia and is more physiologic than bolus doses of glucagon.

Dosing guideline: < 2.5 kg: Not recommended
2.51-5 kg: starting dose of 10mcg/kg/h (target daily dose 0.6 -1.2 mg/day)
> 5 kg: starting dose of 5mcg/kg/h (target daily dose 0.6 mg/day)
Further titration of infusion rate will be dictated by provider

Administration: Continuous IV administration. Central line is NOT required. Compatibility of common medications and solutions have not been tested with glucagon; caution should be used when administering with another agent.

Product guidelines: Currently available as a 0.1 mg/mL or 0.01 mg/mL continuous IV infusion. Product prepared in D5W. Final volume adjusted to dispense a 20 mL or 50 mL syringe. Expiration is 24-hours and must be stored refrigerated.

Mechanism of Action: Glucagon is an endogenous substance in the body which acts by opposing the action of insulin and promoting glycogenolysis. This breaks down glycogen and stimulates gluconeogenesis resulting in an increased concentration of glucose in the blood.

Monitoring: Blood glucose levels should be obtained per the normal NICU protocol or as deemed appropriate by provider. Additionally, glucose infusion rate (GIR) should be monitored. Sodium and platelet count should be obtained at least daily.

Weaning protocol: Infusion can be weaned when blood glucose has remained above target level.

Precautions:
- Increased risk of hyponatremia when patients are receiving glucagon infusions. Serum sodium should be monitored throughout duration of infusion.

- Thrombocytopenia, a rare adverse effect with glucagon infusions most likely in SGA newborn.
- Ileus has been reported in the literature in neonates receiving glucagon infusions.

Adverse effects:

- Infants can become nauseous or vomit if the glucagon infusion is running to quickly
- Tachycardia (increased heart rate)
- Changes in blood pressure can occur while patient is on a glucagon infusion. BP monitored Q3h.

References:

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