Neonatal Endocrine Emergencies

A Primer for the Emergency Physician

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KEYWORDS

• Neonatal emergencies • Hypothyrodism • Congenital adrenal hyperplasia
• Hypoglycemia • Jaundice • Hyponatremia • Hypocalcemia

KEY POINTS

- Neonatal endocrine emergencies are uncommon and may present a particular challenge for diagnosis in the emergency department.
- The overlap between endocrine and metabolic emergencies in neonates is significant.
- The resuscitation principles for neonates remain the same in any neonatal emergency, such as securing the airway and stabilizing hemodynamics.
- Implementing screening programs more broadly worldwide and improving the current tests remains the challenge for future health care providers and those practicing abroad.

INTRODUCTION

Neonates have a tendency of presenting discreetly. Neonatal endocrine emergencies are uncommon and may present a particular challenge for diagnosis in the emergency department. In the United States, newborn screening tests are used for early detection and treatment. Each state has a different panel of required screening tests for genetic, metabolic, and congenital issues, some of which are discussed in this article. Most of the screening tests are not immediately available to the emergency care provider. Although many cases are discovered postpartum in the nursery or neonatal intensive care unit, any health care provider who may deal with deliveries and the care of neonates needs to develop an astute sense for these emergencies and the rapid intervention required to offset any permanent neurologic damage from delayed diagnosis. The overlap between endocrine and metabolic emergencies in neonates is significant, but is beyond the scope of this article. This article focuses on the most common and most

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critical endocrine emergencies encountered in the first 4 weeks of life, including hypoglycemia, jaundice, hypothyroidism, congenital adrenal hyperplasia, inborn errors of metabolism, and common electrolyte disorders.

HYPOGLYCEMIA

Hypoglycemia continues to be the most frequently encountered endocrine abnormality in neonates. Diagnosis of the hypoglycemic newborn based on physical examination alone is difficult. Findings can be subtle and nonspecific. Clinical signs of hypoglycemic include respiratory distress, apnea, lethargy, hypotonia, seizures, jitteriness, myoclonus, temperature instability, weak or high-pitched cry, and difficulty with feeding. These signs could also be the presentation for a multitude of other conditions such as sepsis, congenital heart disease, prematurity, other metabolic diseases, drug withdrawal, or increased intracranial pressure.[1]

A neonate can have transiently low glucose levels that resolve without intervention. It is part of the normal physiologic process for glucose levels to dip after the first few hours after birth. Although the mechanism is not completely understood, it is likely caused by the combination of an abrupt cessation of maternal glucose supply through the placenta and transition to gluconeogenesis and glycogenolysis. More specifically, glucagon and cortisol regulate low blood sugar levels by increasing these processes, which requires some time to take full effect in the neonate.[2] The glycemic nadir (as low as 30 mg/dL) occurs at 1 to 2 hours after birth and slowly rises, reaching adult levels at 3 to 4 days of age.[3,4]

Routine screening and monitoring of blood glucose concentration is not needed in healthy term newborn infants after a normal pregnancy and delivery.[4] The typical heel-prick neonatal screening tests are obtained after 24 hours of life. In contrast, the authors recommend that bedside glucose testing be performed for any patients with complications of delivery, vital sign instability, neurologic findings, maternal history of endocrine disorders, or any other sign of concern. If there is concern that the neonate is hypoglycemic before the 24-hour screening tests are drawn, then it should be obtained immediately. Point-of-care test strip glucose analyzers may vary by 10 to 20 mg/dL especially at the lowest concentrations, therefore laboratory evaluation is recommended.[4] There is no universally accepted definition of hypoglycemia in a neonate who is otherwise healthy with no risk factors.[4,5] An accepted numerical value of less than 47 mg/dL is often cited in the literature. Hypoglycemia in otherwise healthy neonates is generally corrected by initiating feedings.[2]

Risk factors for prolonged hypoglycemia include having a diabetic mother, the infant being small for gestational age (SGA) or large for gestational age (LGA), initial respiratory distress, or prematurity.[2,3] Without the presence of these risk factors, otherwise healthy singleton pregnancies produce more cases of hypoglycemia when the mother spiked a fever during labor, the neonates' family had public rather than private insurance, and if the patient was born earlier while still remaining in the context of being full term.[6] In neonates who are premature or have increased rates of insulin production baseline secondary to being exposed to high levels of blood glucose during gestation within a diabetic mother, the episode of hypoglycemia can be more profound.[2] Newborn hypoglycemia is most common in an infant born to a diabetic mother (either type I or II diabetes mellitus [DM], or gestationally induced DM), wherein the infant was constantly exposed to increased glucose levels from the mother's blood.[2,7] As a compensation response, the fetus' beta cells of the pancreas remain in a state of overproduction. When the placental supply is abruptly cut off, it can take hours to days for the neonatal insulin drive to downregulate.[1] During this time, feedings often suffice.