

# Newborn Critical Care Center (NCCC) Clinical Guidelines

## ACTH (Cosyntropin) Stimulation Test for Suspected Secondary Adrenal Insufficiency

*These guidelines do not apply to patients with suspected primary adrenal insufficiency (e.g. congenital adrenal hyperplasia, adrenal hemorrhage) or suspected pan-hypopituitarism. In these circumstances, a comprehensive evaluation should be performed under guidance from Pediatric Endocrinology.*

### Consider ACTH stimulation testing for any infant exposed to:

1.  $\geq 7$  cumulative days of hydrocortisone for profound hypotension unresponsive to conventional blood pressure management or suspected adrenal crisis
2.  $> 10$  days of dexamethasone for chronic lung disease (i.e. multiple DART courses or a prolonged glucocorticoid course)
3.  $> 10$  cumulative days of steroid treatment (hydrocortisone or dexamethasone) for any indication

### Timing of test:

Testing is most accurate if done at least 4-6 weeks after last dose of steroids. Testing may be ordered sooner (minimum 3 weeks after last dose) if the patient is scheduled for surgery or nearing discharge from the hospital. If surgery is needed prior to 3 weeks from last dose and the patient meets the above criteria, consider treating with stress dose steroids ([Hydrocortisone Stress Dosing](#)) and ordering an ACTH stimulation test prior to discharge.

### ACTH (Cosyntropin) Stimulation Test Protocol:

1. Obtain random cortisol level
  - a. If  $\geq 8.0 \mu\text{g/dL}$ : no further testing is needed; patient does NOT have adrenal suppression
  - b. If  $< 8.0 \mu\text{g/dL}$ : proceed to step 2
2. Obtain baseline cortisol (the prior random cortisol result does not count as baseline), then administer 1 mcg cosyntropin IV over 2-3 minutes
3. Obtain cortisol levels 20 minutes, 30 minutes, and 60 minutes after the cosyntropin dose is given.

### Results:

- A cortisol level  $\geq 15.0 \mu\text{g/dL}$  at either 20, 30, or 60 minutes is considered a normal response and the infant does **NOT** have adrenal suppression.
- If the highest cortisol level at 20, 30 and 60 minutes is  $< 15.0 \mu\text{g/dL}$ , the infant **MAY** be adrenally insufficient. *Pediatric Endocrinology consultation recommended to determine appropriate management.*

If the results are abnormal, the patient may need to receive [stress dose steroids](#) for all subsequent surgical procedures and clinically stressful events until cleared by Pediatric Endocrinology. Pediatric Endocrinology will determine whether the patient should be discharged home with IM Solu-Cortef (to be administered by caregivers for acute illness) and whether patient needs outpatient follow-up. If outpatient medication is indicated, NCCC nurses will instruct caregivers on administration prior to discharge. Please contact / consult on-call Pediatric Endocrinology team prior to submitting outpatient referral to Pediatric Endocrine Clinic.

**References:**

1. Chung H. Adrenal and thyroid function in the fetus and preterm infant. *Korean Journal of Pediatrics* 2014; **57(10)**: 425-433
2. LeDrew R, Bariciak E, Webster R, Barrowman N, Ahmet A. Evaluating the Low-Dose ACTH Stimulation Test in Neonates: Ideal Times for Cortisol Measurement. *Journal of Clinical Endocrinology & Metabolism* 2020; **105(12)**: e4543-e4550
3. Ng PE, Blackburn ME, Brownlee KG, Buckler JM, Dear PR. Adrenal response in very low birthweight babies after dexamethasone treatment for bronchopulmonary dysplasia. *Arch Dis Child* 1989; **64**: 1721-6.
4. Quintos J, Boney C. Transient adrenal insufficiency in the premature newborn. *Current opinion in Endocrinology, Diabetes and Obesity* 2010; **17(1)**: 8-12