

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. ≥ 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 high-dose steroid treatment with hydrocortisone or dexamethasone, *NOT including the low-dose 10-day prophylactic course given to ELBW infants.*

Timing of test:

Testing is most accurate if done at least 4-6 weeks after the last dose of steroids. Testing may be ordered sooner (a minimum of 3 weeks after the 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
 - If $\geq 8.0 \mu\text{g/dL}$: no further testing is needed; patient does NOT have adrenal suppression
 - 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 cosyntropin IV over 2-3 minutes
 - $< 1 \text{ kg}$: 0.5 mcg cosyntropin IV
 - $> 1 \text{ kg}$: 1.0 mcg cosyntropin IV
3. Obtain cortisol levels 30 minutes, and 60 minutes after the cosyntropin dose is given.

Results:

- A cortisol level $\geq 15.0 \mu\text{g/dL}$ at either 30 or 60 minutes is considered a normal response and the infant does **NOT** have adrenal suppression.
- If the highest cortisol level at 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 before 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
5. Kyle P. McNerney, Ana Maria Arbeláez; Steroid Use in the NICU: Treatment and Tapering. *Neoreviews* April 2023; 24 (4): e207–e216. <https://doi.org/10.1542/neo.24-4-e207>
6. LeDrew, R., Bariciak, E., Webster, R., Barrowman, N., & Ahmet, A. (2020). Evaluating the Low-Dose ACTH Stimulation Test in Neonates: Ideal Times for Cortisol Measurement. *The Journal of clinical endocrinology and metabolism*, 105(12), dgaa635. <https://doi.org/10.1210/clinem/dgaa635>