

ACTH STIMULATION TESTING

Definitions

- **Cortisol** is a hormone produced by the adrenal glands in response to stress and plays an important **role in blood pressure and blood sugar** regulation. In cases of adrenal insufficiency, the adrenal glands do not produce enough cortisol and we must provide supplemental cortisol.
- Disruptions of adrenal gland function can be congenital but can also be iatrogenic, caused by long-term exposure to high doses of corticosteroids.
- The **ACTH stimulation test** is used to **diagnose primary or secondary adrenal insufficiency** by testing the adrenal response to ACTH (the hormone that stimulates cortisol production).

Indications

- Consider ACTH stimulation testing for any infants exposed to:
 - Hydrocortisone treatments (usually > 7 days) for severe hypotensive crisis or suspicion of adrenal crisis
 - Greater than 10 days of treatment with dexamethasone for chronic lung disease OR
 - Greater than 10 days of treatment of any steroid treatment (hydrocortisone or dexamethasone) for any causes
- When to proceed to ACTH stimulation testing:
 - Timing of testing remains at discretion of the medical team and/or endocrinology. For this reason, this might vary from patient to patient
 - Usually done 48-72 hours post steroid weaning but may be later (mandatory to be off corticosteroids for a minimum of 24-48hrs)

Key points

- This test can be done either by administering the medication (Cosyntropin) via **IV** access or **IM** injection. In general, if the infant **DOES NOT** have IV access, IM injection will be prioritized (unless otherwise indicated by the medical team).
- Testing needs to be **done between 9 am and 4 pm**, for lab purposes.
- Although side effects are rare with the administration of Cosyntropin, advise the medical team immediately if any of the following are encountered:
 - *Signs of allergic reaction: rash, swelling, fever and/or difficulty breathing*
 - *High blood pressure, increase or diminution of heart rate*
 - *Skin rash or urticaria at injection site*
 - *Swelling of legs or arms*

Materials

- Cosyntropin vial 250 mcg (the medication)
- NS vial for medication reconstitution
- 3 mL syringe for medication reconstitution
- 1 mL syringe for medication administration
- 25g needle for IM administration if no IV access
- NS flush syringe if IV administration
- Alcohol cap if IV administration
- Appropriate disinfection swab (0.5% chlorhexidine + 70% alcohol, or 2% chlorhexidine, depending on GA, weight, and days of life) for skin disinfection
- 2 x cortisol labels for blood work from Oaxis

- 2 x yellow microtubes
- Appropriate size heel prick needle
- Lidocaine 4% cream (Maxilene) if IM administration, with Tegaderm

Procedure

- **Note:** If the IM route will be used, apply Lidocaine 4% cream (topical anesthetic) to the location chosen for administration, as per collective order. Cover site with a Tegaderm. Allow 20-30 minutes for cream to take effect. Factor this time into your timeline.
1. Verify the concordance of the medical prescription and the information written in the CMAR or on pharmacy label.
 2. Print the baseline blood collection label. This should be printed as a "**random cortisol**" sample. In Oacis, you can add in the comment section of the label: "**pre ACTH testing**"
 3. Collect the blood **sample #1** via the heel prick technique. 0.5 ml is needed for a cortisol level in a yellow microtube. Send to central lab. This sample will serve as a baseline level.
 4. Proceed to the dilution of the medication vial as per the instructions on the pharmacy label. (Instructions can also be found in the MUHC pediatric drug formulary on lexi-comp)
 5. Administer the medication via the appropriate route:
 - *If baby has IV ACCESS: administer slow push over 2 minutes, followed by NS flush*
 - *If baby has NO IV ACCESS: administer via IM injection (refer to IM injection protocol for proper administration)*
 6. **Document the exact time of injection.** This is essential for the post cortisol level.
 7. Almost an hour after injection, print the second blood collection label. This should be printed as a "**random cortisol**" sample. In Oacis, you can add in the comment section of the label: "**post ACTH testing**"
 8. **60 min post Cosyntropin injection** collect the blood **sample #2** via the heel prick technique. 0.5 ml is needed for a cortisol level in a yellow microtube. Send to central lab. This sample will serve as post level.
 9. Document the procedure in the nursing notes, as well as any side effects that may have been observed.