

Stressed about adrenal dosing?

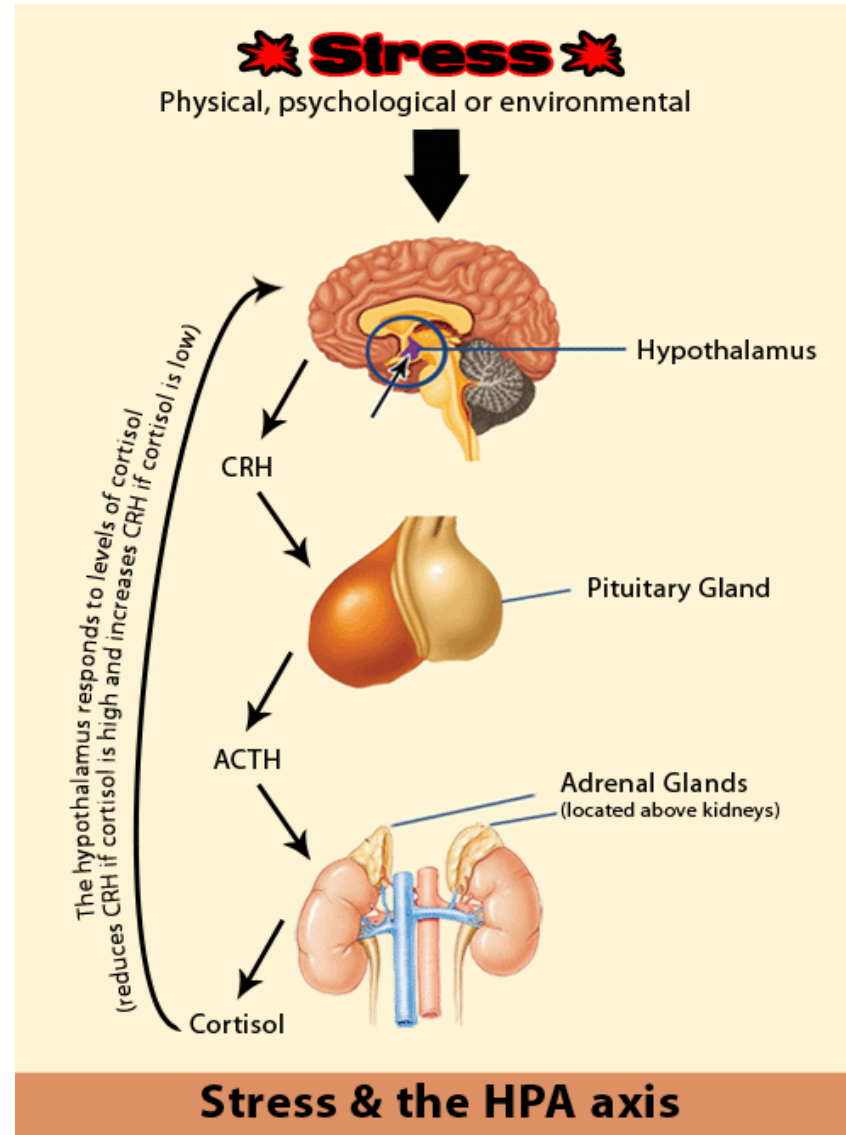
Michelle McLoughlin, MSN, CRNP, CPNP-AC

Pediatric Nurse Practitioner

Division of Endocrinology and Diabetes

The Children's Hospital of Philadelphia

Stress and the HPA Axis



What is Cortisol?

- ☞ Cortisol aka the “stress hormone” is made by the adrenal glands
- ☞ “Fight or Flight” hormone
 - ☞ Needed during times of physical stress (fever, illness, injury, surgery)
- ☞ Required to regulate blood pressure and blood sugar
- ☞ Without it, body could go into adrenal crisis, a medical emergency

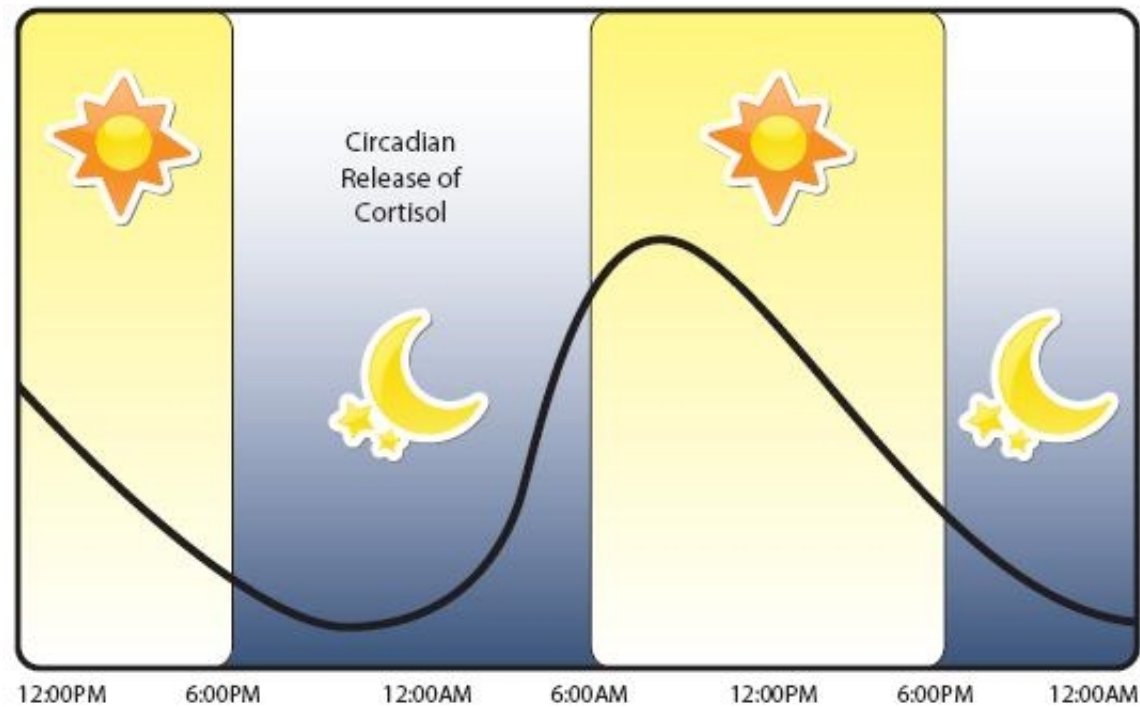


Signs of Adrenal Crisis

- Dehydration
- Dizziness, lightheadedness
- Shock, low blood pressure, high heart rate
- Electrolyte abnormalities
 - Low sodium, high potassium
 - Low blood sugar
- Vomiting and diarrhea
- Severe abdominal pain
- Unexplained fever
- Weight loss, and anorexia
- Loss of consciousness, coma



Diurnal Rhythm



www.DrLam.com

©2010 Michael Lam M.D. All rights reserved.

Causes of Adrenal Insufficiency

❧ Primary Adrenal Insufficiency

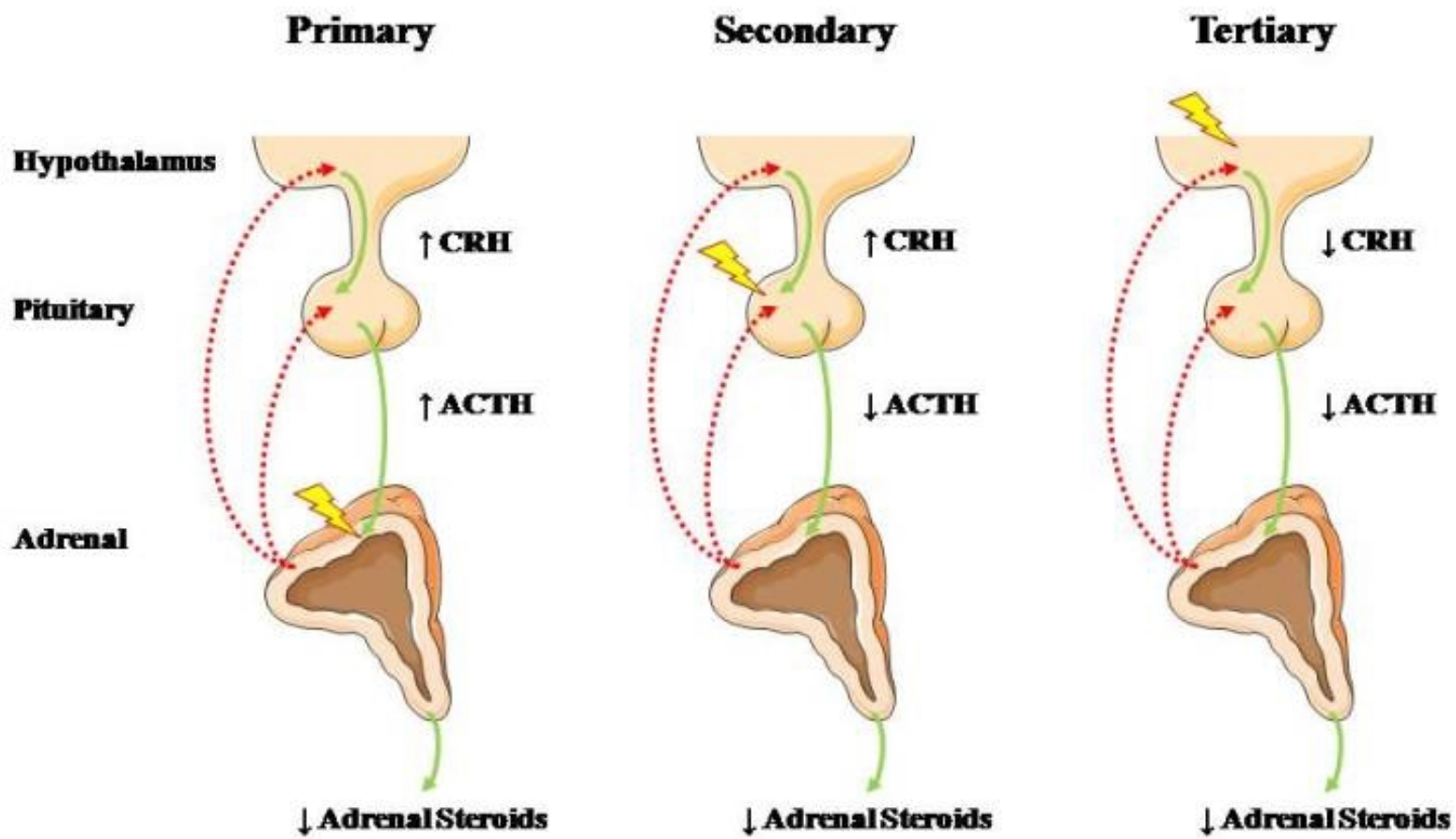
- ❧ Addison's disease (autoimmune), congenital adrenal hyperplasia (CAH), TB, infection/cancer/hemorrhage of the adrenal gland

❧ Secondary Adrenal Insufficiency

- ❧ Panhypopituitarism
- ❧ Isolated failure of ACTH production
- ❧ Patients receiving or who have stopped taking corticosteroids

❧ Tertiary Adrenal Insufficiency

- ❧ Failure of the hypothalamus to stimulate pituitary ACTH production



Daily steroid replacement



- Hydrocortisone is typically the steroid of choice
 - In certain situations different types of glucocorticoids may be recommended (i.e. prednisone)
- Hydrocortisone dosing is divided in twice or three times daily dosing
 - Take highest dose in the morning at awakening
 - For two x daily dosing: Take second dose in the afternoon
 - For three x daily dosing: Take second dose at lunch and third dose in late afternoon

Stress Dose Plan



- ☞ In addition to daily dosing all patients with adrenal insufficiency also must have a stress-dose/emergency plan
 - ☞ Must be trained in emergency steroid administration
 - ☞ Must obtain an emergency card/bracelet/necklace regarding AI
 - ☞ Must carry an emergency kit containing injectable high-dose glucocorticoid (Solu Cortef)

What is “Moderate Stress”

☞ Moderate Stress

- ☞ Fever greater than 101
- ☞ Vomiting once
- ☞ Ear infection
- ☞ Fracture
- ☞ Seizure
- ☞ Concussion



☞ Stress dosing

- ☞ Oral around the clock
 - ☞ Need to be given for at least 24 hours after the end of the stressor
 - ☞ Dosing depends on weight of patient on and type of glucocorticoid

What is "Severe Stress"

Severe Stress

- Looks extremely sick
- Unconscious
- Severe injury
- Can't stop vomiting
- Severe infection requiring hospitalization
- Severe diarrhea with dehydration
- Surgery/anesthesia

Stress dosing

- Oral (if able to tolerate)
- Intramuscular (IM) Solu Cortef
- Intravenous (IV) (in the hospital)
 - Need to be given for at least 24 hours after the end of the stressor
 - Dosing depends on weight of patient on and type of glucocorticoid



What does
NOT require
stress dosing

- School play
- Taking the SATs
- Anxiety
- Nerves
- Dance recital
- Soccer practice



Stress dose steroid letter example

Dear Doctor

Name has adrenal insufficiency and requires "stress dose" hydrocortisone during intercurrent illnesses and procedures.

WHEN WELL

He has a maintenance steroid dose of ***mg hydrocortisone orally three times daily.

DURING INTERCURRENT ILLNESS, MANAGED AT HOME

If your child is sick, injured or having surgery, he/she must receive extra steroid, which is called a "stress dose".

Your child will need a stress dose when he/she has any of the following:

1. A fever above 101 degrees F
2. An illness such as strep throat, ear infection or bronchitis
3. A serious injury such as a broken bone
4. Vomiting one time but looks OK: Wait 20 minutes and then give the stress dose
5. Intense exercise such as running a marathon or hiking 50 miles

Name will need to take Hydrocortisone *** mg every 8 hours for at least 24 hrs until the illness is gone.

DURING AN EMERGENCY

If vomiting or unable to take oral hydrocortisone, an injection of hydrocortisone (Solucortef) ***mg should be administered. His parents have been trained in the administration of this. Following administration of solucortef he should be evaluated in an Emergency Department. *Solucortef is preferred and should be carried by patient or his caregiver. If Solucortef is not available or there would be a delay in administration, emergency alternatives are intramuscular dexamethasone (4mg/m²) or methylprednisolone (20mg/m²).*

DURING SEVERE INTERCURRENT ILLNESS, MANAGED IN HOSPITAL

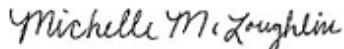
If patient experiences a severe illness such as sepsis requiring admission to the ICU with pressor support, after initial load with *** mg IV hydrocortisone, he will need *** mg IV hydrocortisone every 6 hours with plan for continuation of his stress dose reviewed in consultation with the endocrine team.

FOR PROCEDURES REQUIRING GENERAL ANESTHESIA

For procedures requiring general anesthesia, patient will need *** mg IV Hydrocortisone prior to induction of anesthesia, followed by oral hydrocortisone*** mg every 8 hours for 24 hour period by the family if he is getting discharged to home.

Please call the endocrine fellow on call through the Children's Hospital at 215-590-3174 (daytime) or 215-590-1000 (nights and weekends) for further guidance.

Sincerely,



Michelle McLoughlin, CRNP

Endocrine Division Contact Information: Please call 215-590-

You may bypass our telephone system by using email:

Appointment Requests: FNDOAPPTS@chop.edu

Stress Dose Teaching

☞ Stress Dose Teaching

☞ Solu Cortef IM injection

☞ Class in the Connelly Family Learning Center at CHOP

☞ 3.5 minute video on YouTube:

☞ <https://www.youtube.com/watch?v=moSz5ZoTJFE&t=79s>

☞ "Solu-Cortef Emergency Injection" by The Children's Hospital of Philadelphia





**STRESS
DOSE
AND
KEEP
CALM**