Underactive Adrenal Glands: Adrenal Insufficiency

- The adrenal glands are like “top hats” on the kidneys, their job is to produce different kinds of steroid hormones, especially cortisol & adrenaline.
    - These hormones are **necessary for life** because they regulate stress responses that control blood pressure and how our cells use glucose.
- An underactive adrenal gland is called Adrenal Insufficiency and this can be from different causes
    - Long term use of medications like prednisone or hydrocortisone, which put the adrenal glands “to sleep.” Sometimes a careful wean from the medication can wake them up again.
    - A tumor in the pituitary gland up in the brain can squish the cells that signal to the adrenal glands to do their job, so they end up not producing their hormones.
    - A “stroke” in the adrenal gland or the pituitary gland can shut down hormone production, which is an emergency.
    - Surgical removal of adrenal glands for various reasons.
    - An autoimmune disease that attacks the adrenal glands so they can’t function.
- **It’s important to know that adrenal insufficiency is a serious condition and requires treatment for the patient’s safety and health. This is NOT “adrenal fatigue” for which there is no biochemical evidence and is not a diagnosis recognized by any professional endocrine societies.**
- How do we diagnose adrenal insufficiency?
    - We look to see if there are medications on the patient’s list that could cause adrenal glands to be underactive. We remove these medications if appropriate.
    - A cortisol level measures adrenal function, and it should be highest at 8:00am. If this number is less than 5, we have to figure out why.
    - An ACTH level measures how hard the pituitary gland is “asking” the adrenal glands to make cortisol. If cortisol is low, a normal response would be a very high ACTH.
        - If ACTH is low, then the pituitary gland isn’t doing ITS job and we have to figure out why, usually by doing an MRI of the brain and measuring other pituitary hormones.
        - If cortisol is low and ACTH is high, we may do a CT scan of the adrenal glands and check certain antibodies.
- Once adrenal insufficiency is diagnosed, what do we do about it?
    - If there is an underlying reason for this, we try to resolve that so the adrenal glands can go back to normal.
    - If the hormones need to be replaced, this can be done easily with pills: hydrocortisone, prednisone and fludrocortisone, depending on the patient’s needs.

    - If the antibodies are positive, this is called Addison's Disease, but there is no treatment for the autoimmune condition itself, and patients must take hormone replacement.
    - If hormone replacement is used, the patient must know that this medication is **REQUIRED FOR LIFE**, and he/she cannot miss any doses.
- How do I take steroid hormones?
    - We try to mimic the body's natural rhythm for cortisol as closely as possible, so hydrocortisone is taken twice a day, the largest dose is first thing in the morning, and the second dose will be early/mid afternoon.
    - If the patient needs fludrocortisone, that is taken once daily, in the morning.
    - If the patient prefers prednisone, this is usually only once daily.
- **What is stress dosing?**
    - **When you are sick (i.e., the flu, etc.) you have to double the dose of your hydrocortisone each day for the duration of your illness,** then go back to your normal dose.
- What about emergencies?
    - **All patients with adrenal insufficiency should have a medical bracelet** that can alert first responders to this condition, in case the patient is found unconscious.
    - If the patient becomes acutely ill with nausea/vomiting and are unable to take the usual pills for steroid replacement, he/she must use the dexamethasone injection kit for emergency hormone replacement.
        - **This is a temporary "stopgap" so after injection, the patient must proceed to an emergency room for treatment.**

Resources

- NIH https://www.niddk.nih.gov/health-information/endocrine-diseases/adrenal-insufficiency-addisons-disease
- Mayo Clinic www.mayoclinic.com
- Flavio A. Cadegiani & Claudio E. Kater. **Adrenal fatigue does not exist: a systematic review** *BMC Endocrine Disorders*. 2016**16**:48 https://doi.org/10.1186/s12902-016-0128-4