

LAB TESTING FOR ADRENAL INSUFFICIENCY

Initial tests are simple & can be ordered by any physician:

The morning cortisol and the baseline ACTH sampled and interpreted together, should indicate the direction for further testing and/or referral to a specialist. The ACTH stimulation test is often ordered first. It is important to request that the baseline ACTH is sampled BEFORE the injection. If the problem originates in the pituitary or hypothalamus, it can go undetected by the ACTH stimulation test alone, leading to misdiagnosis.

Confirmation of the clinical diagnosis of adrenal insufficiency is a three-stage process:

1. Demonstrating inappropriately low cortisol secretion.
2. Determining whether the cortisol deficiency is dependent on or independent of corticotropin (ACTH) deficiency and evaluating mineralocorticoid secretion in patients without ACTH deficiency.
3. Seeking a treatable cause of the primary disorder (e.g., infiltrative process involving the adrenal glands or a pituitary adenoma compromising normal pituitary function)

Tests to evaluate the HPA axis:

The morning serum cortisol checks baseline adrenal cortisol production. It should be drawn between 8 and 9am.

The baseline ACTH test evaluates pituitary corticotropin, (ACTH) production. It should be drawn simultaneously with the morning cortisol sample.

The ACTH stimulation test evaluates stimulated adrenal cortisol response. This test is used to confirm or exclude PAI if the baseline cortisol result is indeterminate. Lack of appropriate response may indicate adrenal atrophy in chronic SAI patients. Adequate response to the ACTH stimulation test does not eliminate the possibility of secondary AI.

Tests to evaluate the HPA axis - continued:

The Overnight Metyrapone and the Insulin Tolerance Test (ITT), are used to measure stimulated pituitary ACTH production if secondary AI is suspected. Choice of which test to use is based on patient profile. Current recommendations favor the Overnight Metyrapone. It is more accurate, less expensive, and easier to administer than the ITT.

Pre-testing considerations:

The following hormones or drugs may interfere with accurate test results.

- Glucocorticoids or corticosteroids in any form, including topical, inhaled, injected, and oral tablets/capsules*.
- Birth control or other estrogens, including soybean food products and menopause formulas.
- Drugs that inhibit cortisol biosynthesis, such as etomidate, ketoconazole, fluconazole, metyrapone, and suramin.
- Drugs that accelerate the metabolism of cortisol and most synthetic glucocorticoids by inducing hepatic mixed-function oxygenase enzymes, such as phenytoin, barbiturates, mitotane, and rifampin.
- High dose progestins or chronic administration of opiates.

* Recommended times for discontinuing steroids before testing are 12 hours for Hydrocortisone, 24 hours for Prednisone. Dexamethasone is commonly prescribed for patients suspected of adrenal insufficiency who require testing to confirm the diagnosis. It is not read by radioimmunoassay, the most common type of lab test for cortisol. This is an accurate way to assess HPA axis function provided that testing is done within the first two weeks of treatment. After this time period Dexamethasone will begin to suppress HPA axis function.



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ADRENAL INSUFFICIENCY
CUSHING'S SYNDROME
ADRENAL FATIGUE

How to recognize the
differences & how to test



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ADRENAL INSUFFICIENCY

Adrenal Insufficiency (AI) happens when the adrenal glands don't produce enough cortisol.

There are over 60 different causes of Adrenal Insufficiency including autoimmune*, head injury or steroid treatment** for another condition. Any form of AI is a life-threatening condition because cortisol is essential to maintain many basic body functions, such as blood pressure and heart rate. Most adrenal insufficient patients are dependent on cortisol replacement for life. The non-specific symptoms of such as nausea, fatigue, and pain are often mistaken for other conditions.

Initial testing for adrenal insufficiency can be simple and labs ordered by any physician. The morning cortisol and the baseline ACTH sampled and interpreted together, should indicate the direction for further testing and/or referral to a specialist (see reverse side for details and suggested sequence).

Diagnostic imaging (CT Scan for adrenal imaging, MRI for pituitary imaging) may confirm the cause.

* Example for primary AI (PAI) with root cause in the adrenal glands

** Example for secondary AI (SAI) caused by insufficiency of pituitary gland to produce enough ACTH to stimulate the adrenals

CUSHING'S SYNDROME

Cushing's Syndrome is a condition where the body has too much cortisol.

It can be caused by taking replacement cortisol in excess of what the body can use, or from the body producing too much cortisol. Adrenal, pituitary, or ectopic tumors can cause the body to produce too much cortisol. When a pituitary tumor causes overproduction of adrenocorticotropic hormone, ACTH, it's called Cushing's Disease. ACTH signals the adrenal glands to produce cortisol. Surgery to correct Cushing's Syndrome can cause adrenal insufficiency.

Too much cortisol causes fatigue, unexplained weight gain, and can be life-threatening.

The most common tests used to diagnose Cushing's Syndrome are the 24-hour urinary free cortisol, measurement of midnight plasma cortisol or late-night salivary cortisol, and the low-dose dexamethasone suppression test.

**Adrenal Insufficiency = not enough cortisol
Cushing's Syndrome = too much cortisol**

ADRENAL FATIGUE

The term Adrenal Fatigue is based on the **theory** that under constant stress the adrenal glands initially produce too much cortisol. This leads to eventual "fatigue" when the adrenal glands no longer produce enough cortisol. Current literature does not support this theory. Parameters for the diagnosis of Adrenal Fatigue have not been established. Without defined test results and symptoms, a diagnosis of Adrenal Fatigue is based on opinion.

A person diagnosed with Adrenal Fatigue may actually have a life-threatening endocrine disorder, such as Adrenal Insufficiency (not enough cortisol) or Cushing's Syndrome (too much cortisol).

For more information about Adrenal Insufficiency including research papers, published guidelines, and compilations of information, visit:

www.adrenalinsufficiency.org



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