

The Cleveland Clinic Manual of Dynamic Endocrine Testing

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Cleveland Clinic



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Preface

Dynamic endocrine testing is the cornerstone of practice in endocrinology and plays an important role in clinical decision-making. Structured and standardized testing protocols are also very important for billing and compliance with high quality standards. However, evidence-based national guidelines for these tests are unfortunately missing.

We in the Cleveland Clinic Department of Endocrinology recently updated our endocrine dynamic testing protocols utilizing current best evidence. These dynamic endocrine tests have been created via a peer review process that included 25 experienced endocrinologists, with each test being discussed at weekly grand rounds. We decided to publish our experience as *The Cleveland Clinic Manual of Dynamic Endocrine Testing*, which will provide an up-to-date practical guide for endocrinologists, nurses, and their staff, both within the USA and outside, who need to perform and interpret dynamic endocrine testing in their everyday practice, as well as medical students, residents, and fellows who have interest in endocrinology.

Each chapter presents of a particular test. Most chapters follow a fairly consistent format covering indication, preparation, materials, interpretation, and caveats. The portion that outlines the actual procedure of the test is presented separately at the end of each chapter for ease of use and reproducibility.

We give special thanks to the physicians and nurses in the Cleveland Clinic Department of Endocrinology, who have contributed to the creation of this valuable book.

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Part I
Dynamic Tests in Pituitary/Adrenal
Disorders

Chapter 1

ACTH Stimulation Test for Adrenal Insufficiency with Total Cortisol Levels

Indication: This test is performed to determine whether the adrenal glands can respond normally to ACTH by producing cortisol.

Preparation: Patients should be off glucocorticoids that potentially interfere with the cortisol assay (hydrocortisone, prednisone) for 24 h pretesting. Dexamethasone may be used.

Materials Needed: Three (3) gold top tubes labeled as baseline, 30, and/or 60 min

Cortisol:
Gold top tube

Cortrosyn 250 mcg

Syringes/needles

Assay for Cortisol: Chemiluminescence immunoassay (CLIA).

Precautions: Cosyntropin is category C for pregnancy.

Interpretation: Normal response: Peak stimulated cortisol value > 18 mcg/dl at 30 min [1, 2]. Most patients achieve higher cortisol levels at 60 min compared to 30 min value following 250 mcg cortrosyn administration [2]. Accordingly, a cut-off value of 18 mcg/dL at 60 min may be associated with an increased false positive result.

Caveats:

- Taking oral estrogen may result in elevation of the total cortisol level due to increased corticosteroid binding globulin [3].
- Patients with albumin <2.5 gr/dL may have a low cortisol level [4].
- Sensitivity for the test is limited in secondary adrenal insufficiency. Specificity is >95%, thus a positive cosyntropin test result substantially increases the likelihood that the patient has secondary adrenal insufficiency [5].

Procedure: Completed as outpatient

1. Draw blood sample for baseline serum cortisol.
2. Give Cortrosyn 250 mcg IM.
3. At 30 and/or 60 min, draw blood samples for serum cortisol.

Physician name and signature: _____

RN performing the procedure: _____

Additional orders by physician: _____

	Baseline	30 min	60 min
Cortisol			

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Chapter 2

ACTH Stimulation Test for Adrenal Insufficiency with Free Cortisol Levels

- Indication:** This test is performed to determine whether the adrenal glands can respond normally to ACTH by producing free cortisol [1, 2]. This test is particularly helpful in patient with albumin <2.5 mg/dL or low CBG.
- Preparation:** Patients should be off glucocorticoids that potentially interfere with the cortisol assay (hydrocortisone, prednisone) for 24 h pretesting. Dexamethasone may be used.
- Materials Needed:** Three (3) gold top tubes labeled as baseline, 30, and/or 60 min
- | | |
|---|---|
| <p>Free cortisol 0.6 ml:
Gold top tube.
Transport: Frozen.
Remove serum from cells and freeze within 2 hours after collection.</p> | <p>Cortrosyn 250 mcg
Syringes/needles</p> |
|---|---|
- Assay for Cortisol:** Electrochemiluminescence immunoassay (ECLIA).
- Precautions:** Cosyntropin is category C for pregnancy.
- Interpretation:** Normal response: Peak stimulated cortisol value >1.2 mcg/dl [3, 4] at 30 or 60 min. Most subjects achieve higher cortisol levels at 60 min compared to the 30 min value following 250 mcg of cosyntropin administration.