MAYO CLINIC LABORATORIES

Test Definition: SALCT

Cortisol, Saliva

Overview

Useful For

Screening for Cushing syndrome

Diagnosis of Cushing syndrome in patients presenting with symptoms or signs suggestive of the disease

Special Instructions

- Cortisol - Saliva Collection Instructions

Method Name

Liquid Chromatography Tandem Mass Spectrometry (LC-MS/MS)

NY State Available

Yes

Specimen

Specimen Type

Saliva

Necessary Information

Collection time is required.

Specimen Required

Patient Preparation:

1. Do not brush teeth before collecting specimen.
2. Do not eat or drink for 15 minutes prior to specimen collection.

Supplies: Cortisol, Saliva Collection Kit (T514)

Container/Tube: SARSTEDT Salivette

Specimen Volume: 1.5 mL

Collection Instructions:

1. Provide patient with a Saliva Collection Kit (Salivette) containing the Cortisol - Saliva Collection Instructions and ask them to follow the instructions as written.
2. Instruct patient to collect specimen between 11 p.m. and midnight and record collection time on the Cortisol - Saliva Collection Instructions sheet.
3. Instruct patient to return Cortisol - Saliva Collection Instructions with the appropriately labeled Salivette to the laboratory.

Additional Information:

1. Reference values are also available for an 8 a.m. (7 a.m.-9 a.m.) or a 4 p.m. (3 p.m.-5 p.m.) collection, however, the 11 p.m. to midnight collection is preferred.

2. If multiple specimens are collected, submit each vial under a separate order.

Forms

If not ordering electronically, complete, print, and send General Request (T239)

Specimen Minimum Volume

0.6 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Saliva	Refrigerated (preferred)	28 days	
	Frozen	60 days	
	Ambient	28 days	

Clinical & Interpretive

Clinical Information

Cortisol levels are regulated by adrenocorticotropic hormone (ACTH), which is synthesized by the pituitary in response to corticotropin-releasing hormone (CRH). Cushing syndrome results from overproduction of glucocorticoids because of either primary adrenal disease (adenoma, carcinoma, or nodular hyperplasia) or an excess of ACTH (from a pituitary tumor or an ectopic source). ACTH-dependent Cushing syndrome due to a pituitary corticotroph adenoma is the most frequently diagnosed subtype; most commonly seen in women in the third through fifth decades of life.

CRH is released in a cyclic fashion by the hypothalamus, resulting in diurnal peaks (elevated in the morning) and nadirs (low in the evening) for plasma ACTH and cortisol levels. The diurnal variation is lost in patients with Cushing syndrome and these patients have elevated levels of evening plasma cortisol. The measurement of late-night salivary cortisol is an effective and convenient screening test for Cushing syndrome.(1) In a recent study from the National Institute of Health, nighttime salivary cortisol measurement was superior to plasma and urine free cortisol assessments in detecting patients with mild Cushing syndrome.(2) The sensitivity of nighttime salivary cortisol measurements remained superior to all other measures. The distinction between Cushing syndrome and pseudo-Cushing states is most difficult in the setting of mild-to-moderate hypercortisolism. Subtle increases in salivary cortisol collected at midnight (cortisol of nadir) appear to be one of the earliest abnormalities in Cushing syndrome.

Reference Values

7 a.m.-9 a.m.: 100-750 ng/dL
3 p.m.-5 p.m.: <401 ng/dL
11 p.m.-midnight: <100 ng/dL

Interpretation

Cushing syndrome is characterized by increased salivary cortisol levels, and late-night saliva cortisol measurements may

be the optimum test for the diagnosis of Cushing syndrome. It is standard practice to confirm elevated results at least once. This can be done by repeat late-night salivary cortisol measurements, midnight blood sampling for cortisol (CORT / Cortisol, Serum), 24-hour urinary free cortisol collection (CORTU / Cortisol, Free, 24 Hour, Urine), or overnight dexamethasone suppression testing. Upon confirmation of the diagnosis, the cause of hypercortisolism, adrenal versus pituitary versus ectopic adrenocorticotropic hormone production, needs to be established. This is typically a complex undertaking, requiring dynamic testing of the pituitary adrenal axis and imaging procedures. Referral to specialized centers or in-depth consultation with experts is strongly recommended.

Cautions

Acute stress (including hospitalization and surgery), alcoholism, depression, and many drugs (eg, exogenous glucocorticoids, anticonvulsants) can obliterate normal diurnal variation, affect response to suppression/stimulation tests, and cause elevated cortisol levels.

Cortisol levels may be increased in pregnancy and with exogenous estrogens.

Midnight salivary cortisol assay cannot diagnose hypocortisolism or Addison disease because of the limited sensitivity of the assay method.

Supportive Data

Using this assay, it was determined that late-night salivary cortisol is in the range of 100 ng/mL to 6,000 ng/dL (2.76-166 nmol/L) for clinically confirmed Cushing patients (N=11).

Normal values are based on 36 donors (ages 0-8 years), 46 donors (ages 9-17 years), and 102 donors (age >17 years).

Clinical Reference

1. Raff H, Raff JL, Findling JW. Late-night salivary cortisol as a screening test for Cushing's syndrome. J Clin Endocrinol Metab. 1998;83:2681-2686
2. Papanicolaou DA, Mullen N, Kyrou I, Nieman LK. Nighttime salivary cortisol: a useful test for the diagnosis of Cushing's syndrome. J Clin Endocrinol Metab. 2002;87:4515-4521
3. Lin CL, Wu TJ, Machacek DA, Jiang NS, Kao PC. Urinary free cortisol and cortisone determined by High Performance Liquid Chromatography in the Diagnosis of Cushing’s Syndrome. J Clin Endo Metab. 1997;82:151-155
4. Mohamed RS, Abuelgasim B, Barker S, et al. Late-night salivary cortisol and cortisone should be the initial screening test for Cushing's syndrome. Endocr Connect. 2022;11(7):e220050. doi:10.1530/EC-22-0050

Performance

Method Description

Deuterated cortisol (d3-cortisol) is added to 0.1 mL sample as an internal standard. Cortisol and d3-cortisol are extracted from the specimen using online turbulent flow high-performance liquid chromatography and analyzed by liquid chromatography-tandem mass spectrometry using multiple reaction monitoring in positive mode. The following transitions are used for analysis: Cortisol: 363.3/121.1; d3-cortisol: 366.3/121.1.(Taylor RL, Machacek DA, Singh RJ. Validation of a high-throughput liquid chromatography-tandem mass spectrometry method for urinary cortisol and cortisone. Clin Chem. 2002;48:1511-1519)

PDF Report
No

Day(s) Performed
Monday through Friday

Report Available
2 to 4 days

Specimen Retention Time
2 weeks

Performing Laboratory Location
Rochester

Fees & Codes

Fees
- Authorized users can sign in to Test Prices for detailed fee information.
- Clients without access to Test Prices can contact Customer Service 24 hours a day, seven days a week.
- Prospective clients should contact their account representative. For assistance, contact Customer Service.

Test Classification
This test was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
82533

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
SALCT	Cortisol, Saliva	2142-8

Result ID	Test Result Name	Result LOINC® Value
84225	Cortisol, Saliva	2142-8
23612	AM Cortisol	58674-3
23613	PM Cortisol	58668-5
23614	Midnight Cortisol	58642-0