
Overview

Useful For

Confirming the presence of the listed synthetic glucocorticoids (see Interpretation)

Confirming the cause of secondary adrenal insufficiency

Method Name

Liquid Chromatography-Tandem Mass Spectrometry (LC-MS/MS) Stable Isotope Dilution Analysis

NY State Available

Yes

Specimen

Specimen Type

Urine

Ordering Guidance

This method cannot detect the presence of fluticasone propionate in serum. Fluticasone propionate is quickly metabolized to fluticasone 17-beta carboxylic acid in urine. To screen for this metabolite, order 17BFP / Fluticasone 17-Beta-Carboxylic Acid, Random, Urine.

Specimen Required

Supplies: Urine tubes, 10 mL (T068)

Container/Tube: Plastic, 10-mL urine tube

Specimen Volume: 5 mL

Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

Reject Due To

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

Specimen Minimum Volume

0.6 mL

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Urine	Frozen (preferred)	14 days	

Clinical & Interpretive**Clinical Information**

Synthetic glucocorticoids are widely used and have important clinical utility both as anti-inflammatory and immunosuppressive agents. The medical use of these agents, as well as their surreptitious use, can sometimes lead to a confusing clinical presentation. Patients exposed to these steroids may present with clinical features of Cushing syndrome but with suppressed cortisol levels and evidence of hypothalamus-pituitary-adrenal axis suppression.

The fluticasone propionate analyte is reported with this test and is also available separately, see 17BFP / Fluticasone 17-Beta-Carboxylic Acid, Random, Urine for more information.

Reference Values

Negative

Cutoff concentrations

Betamethasone: 0.10 mcg/dL

Budesonide: 0.20 mcg/dL

Dexamethasone: 0.10 mcg/dL

Fludrocortisone: 0.10 mcg/dL

Fluticasone propionate: 0.10 mcg/dL

Megestrol acetate: 0.10 mcg/dL

Methylprednisolone: 0.10 mcg/dL

Prednisolone: 0.10 mcg/dL

Prednisone: 0.10 mcg/dL

Triamcinolone acetonide: 0.10 mcg/dL

Values for normal patients not taking these synthetic glucocorticoids should be less than the cutoff concentration (detection limit).

Interpretation

This test screens for and quantitates, if present, the following synthetic glucocorticoids: betamethasone, budesonide, dexamethasone, fludrocortisone, , , megestrol acetate, methylprednisolone, prednisolone, prednisone, , and triamcinolone acetonide.

The presence of synthetic glucocorticoids in urine indicates current or recent use of these compounds. Since several of these compounds exceed the potency of endogenous cortisol by 1 or more orders of magnitude, even trace levels may be associated with Cushingoid features.

Cautions

The fluticasone propionate analyte is reported with this test and is also available separately; see 17BFP / Fluticasone 17-Beta-Carboxylic Acid, Random, Urine for more information.

This method cannot detect all of the available synthetic steroids either available as pharmaceutical compounds or chemicals present in food. The assay confirms only the listed synthetic glucocorticoids (see Interpretation).

Lack of detection does not preclude use of synthetic glucocorticoid because adrenal suppression may persist for some time after the exogenous steroid is discontinued.

Clinical Reference

1. Cave A, Arlett P, Lee E: Inhaled and nasal corticosteroids: factors affecting the risks of systemic adverse effects. *Pharmacol Ther.* 1999 Sep;83(3):153-179
2. Bijlsma JW, van Everdingen AA, Huisman M, De Nijs R, Jacobs JW: Glucocorticoids in rheumatoid arthritis: effects on erosions and bone. *Ann NY Acad Sci.* 2002 Jun;966:82-90
3. Sandborn WJ: Steroid-dependent Crohn's disease. *Can J Gastroenterol.* 2000 Sep;14 Suppl C:17C-22C
4. Benvenuti S, Brandi ML: Corticosteroid-induced osteoporosis: pathogenesis and prevention. *Clin Exp Rheumatol.* 2000 Jul-Aug;18(4 Suppl 20):S64-S66

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5. Loke TK, Sousa AR, Corrigan CJ, Lee TH: Glucocorticoid-resistant asthma. *Curr Allergy Asthma Rep.* 2002 Mar;2(2):144-150
6. Fardet L, Petersen I, Nazareth I. Monitoring of patients on long-term glucocorticoid therapy: a population-based cohort study. *Medicine (Baltimore).* 2015;94(15):e647. doi: 10.1097/MD.0000000000000647
7. Cronin JJ, McCoy S, Kennedy U, et al: A randomized trial of single-dose oral dexamethasone versus multidose prednisolone for acute exacerbations of asthma in children who attend the emergency department. *Ann Emerg Med.* 2016 May;67(5):593-601.e3. doi: 10.1016/j.annemergmed.2015.08.001

Performance

Method Description

The synthetic glucocorticoids are extracted from 0.5 mL of urine using an acetonitrile protein precipitation followed by methylene chloride liquid extraction of the solvent. Cortisol-9, 11, 12, 12-d, and triamcinolone-d1 acetonide-d6 are added to each sample before the liquid extraction and serve as the internal standards. Then, 17 mL of the reconstituted sample extract is injected into a high-performance liquid chromatography (HPLC) system and analyzed by tandem mass spectrometry (LC-MS/MS). The mass spectrometer has an electrospray interface and is operated in the multiple-reaction monitoring positive mode. The calibration utilizes a 4-point standard curve over a concentration range of 0 to 25 mcg/dL. (McWhinney BC, Ward G, Hickman PE: Improved HPLC method for simultaneous analysis of cortisol, 11-deoxycortisol, prednisolone, methylprednisolone, and dexamethasone in serum and urine. *Clin Chem.* 1996;42:979-981; Savu S, Silvestro L, Haag A, Sorgel F: A confirmatory HPLC-MS/MS method for ten synthetic corticosteroids in bovine urines. *J Mass Spectrom.* 1996 December;31[12]:1351-1363; Djedovic NK, Rainbow SJ. Detection of synthetic glucocorticoids by liquid chromatography-tandem mass spectrometry in patients being investigated for Cushing's syndrome. *Ann Clin Biochem.* 2011 Nov;48(Pt 6):542-9. doi: 10.1258/acb.2011.010250)

PDF Report

No

Specimen Retention Time

3 months

Performing Laboratory Location

Rochester

Fees & Codes

Test Classification

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

CPT Code Information

80299

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
SGSU	Synthetic Glucocorticoid Screen, U	46959-3

Result ID	Reporting Name	LOINC®
23562	Betamethasone	46946-0
23563	Budesonide	46947-8
23564	Dexamethasone	46948-6
23565	Fludrocortisone	46949-4
23568	Fluticasone Propionate	46952-8
23569	Megestrol Acetate	46953-6
23570	Methylprednisolone	46954-4
23571	Prednisolone	46955-1
23572	Prednisone	46956-9
23574	Triamcinolone Acetonide	46958-5