Test Definition: SGSU

Synthetic Glucocorticoid Screen, Random, Urine

Overview

Useful For

Confirming the presence of listed synthetic glucocorticoids in urine specimens (see Interpretation)

Confirming the cause of glucocorticoid-induced adrenal insufficiency

This test is **not useful** for detection of fluticasone propionate.

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

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.

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
Urine	Frozen	14 days	

Clinical & Interpretive

Clinical Information

The primary use of this test is to assess exposure to synthetic glucocorticoids in patients with suspected central adrenal insufficiency.

Synthetic glucocorticoids are widely used as anti-inflammatory and immunosuppressive agents. Synthetic glucocorticoids can be used through various routes: oral, intravenous, intramuscular, inhaled, intranasal, and topical. In most cases, exposure to synthetic glucocorticoids is clearly documented in the medical record. However, occasionally, exposure to synthetic glucocorticoids is not clearly evident. This may occur when patients use non-prescription preparations (usually oral or topical) that have glucocorticoids.

Exposure to synthetic glucocorticoids leads to development of features of Cushing syndrome (weight gain, abdominal obesity, moon facies, skin thinning, easy bruising, and metabolic comorbidities) or to glucocorticoid-induced adrenal insufficiency due to hypothalamic-pituitary-adrenal axis suppression by the circulating supraphysiologic synthetic glucocorticoids. Hormonal work up in these cases demonstrates very low corticotropin and cortisol concentrations.

This test allows for measurement of nine synthetic glucocorticoids in patients in whom exogenous glucocorticoid exposure is suspected.

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
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 serum 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

cause hypothalamic-pituitary-adrenal axis suppression with development of glucocorticoid-induced adrenal insufficiency.

Cautions

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

Lack of detection of listed synthetic glucocorticoids does not exclude previous exposure to one or more of tested glucocorticoids, as glucocorticoid-induced adrenal insufficiency (and resolution of features of overt Cushing syndrome) may persist for weeks-months after exogenous glucocorticoids were discontinued. In a patient with documented glucocorticoid exposure, circulating concentrations of synthetic glucocorticoids depend on the route of administration (detected for longer time if joint injection), dose and type of glucocorticoid that influence metabolism and clearance of the glucocorticoid (longer for triamcinolone).

Clinical Reference

1. Cave A, Arlett P, Lee E. Inhaled and nasal corticosteroids: factors affecting the risks of systemic adverse effects. Pharmacol Ther. 1999;83(3):153-179
2. 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;48(Pt 6):542-9. doi:10.1258/acb.2011.010250
3. Bijlsma JW, Van Everdingen AA, Huisman M, De Nijs RN, Jacobs JW. Glucocorticoids in rheumatoid arthritis: effects on erosions and bone. Ann N Y Acad Sci. 2002;966:82-90. doi:10.1111/j.1749-6632.2002.tb04205.x
4. Sandborn WJ. Steroid-dependent Crohn's disease. Can J Gastroenterol. 2000 Sep;14 Suppl C:17C-22C
5. Benvenuti S, Brandi ML: Corticosteroid-induced osteoporosis: pathogenesis and prevention. Clin Exp Rheumatol. 2000;18(4 Suppl 20):S64-S66
6. Loke TK, Sousa AR, Corrigan CJ, Lee TH. Glucocorticoid-resistant asthma. Curr Allergy Asthma Rep. 2002;2(2):144-150
7. 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
8. 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;67(5):593-601.e3. doi:10.1016/j.annemergmed.2015.08.001
9. Ponzetto F, Parasiliti-Caprino M, Settanni F, et al. Simultaneous measurement of cortisol, cortisone, dexamethasone and additional exogenous corticosteroids by rapid and sensitive LC-MS/MS analysis. Molecules. 2022;28(1):248. Published 2022 Dec 28. doi:10.3390/molecules28010248

Performance

Method Description

The synthetic glucocorticoids (betamethasone, budesonide, dexamethasone, fludrocortisone, megestrol acetate, methylprednisolone, prednisolone, prednisone, triamcinolone acetonide) as well as cortisol and cortisone are extracted from 0.5 mL of urine or serum using an acetonitrile protein precipitation followed by liquid/liquid extraction of the supernatant. Cortisol-d4, triamcinolone-d1 acetonide-d6, dexamethasone-d4, and cortisone-d7, are added to each

sample before the acetonitrile protein precipitation and serve as the internal standards. The reconstituted sample extract is injected onto a high performance liquid chromatography system and analyzed by liquid chromatography tandem mass spectrometry.(Taylor RL, Grebe SK, Singh RJ. Quantitative, highly sensitive liquid chromatography-tandem mass spectrometry method for detection of synthetic corticosteroids. Clin Chem. 2004;50[12]:2345-52. doi:10.1373/clinchem.2004.033605)

PDF Report
No

Day(s) Performed
Wednesday

Report Available
5 to 14 days

Specimen Retention Time
3 months

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

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
80299

LOINC® Information

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

Result ID	Test Result Name	Result LOINC® Value
23562	Betamethasone	46946-0
23563	Budesonide	46947-8

23564	Dexamethasone	46948-6
23565	Fludrocortisone	46949-4
23569	Megestrol Acetate	46953-6
23570	Methylprednisolone	46954-4
23571	Prednisolone	46955-1
23572	Prednisone	46956-9
23574	Triamcinolone Acetonide	46958-5