Test Definition: LAMO

Lamotrigine, Serum

Overview

Useful For

Monitoring serum concentration of lamotrigine

Assessing compliance

Adjusting lamotrigine dose in patients receiving other anticonvulsant drugs that interact pharmacokinetically with lamotrigine

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube:
Preferred: Red top
Acceptable: Serum gel
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions:
1. Collect blood immediately before next scheduled dose.
2. **Only** for sustained-release formulations, collect blood a minimum of 12 hours after last dose.
3. Within 2 hours of collection, centrifuge.
4. For red-top tubes, immediately aliquot serum into a plastic vial.
5. For serum gel tubes, **the serum must be aliquoted into a plastic vial within 24 hours of collection**.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Neurology Specialty Testing Client Test Request (T732)
-General Request (T239)
-Therapeutics Test Request (T831)

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Lamotrigine (Lamictal) is approved for therapy of bipolar I disorder and a wide variety of seizure disorders including Lennox-Gastaut syndrome, primary generalized tonic-clonic seizures, and partial seizures. Its many off-label uses include treatment of migraine, trigeminal neuralgia, and treatment-refractory depression. Lamotrigine inhibits glutamate release (an excitatory amino acid) and voltage-sensitive sodium channels to stabilize neuronal membranes; it also weakly inhibits the 5-HT3 (serotonin) receptor.

Lamotrigine oral bioavailability is very high (approximately 98%). The drug is metabolized by glucuronic acid conjugation to inactive metabolites. The half-life is 25 to 33 hours in adults but decreases with concurrent use of phenytoin or carbamazepine (13-14 hours) and increases with concomitant valproic acid therapy (59-70 hours), kidney dysfunction, or hepatic impairment. The therapeutic range is relatively wide, 3 to 15 mcg/mL for most individuals. Common adverse effects are dizziness, ataxia, blurred or double vision, nausea, or vomiting.

Reference Values

Patients receiving therapeutic doses usually have lamotrigine concentrations of 3.0-15.0 mcg/mL.

Interpretation

The serum concentration should be interpreted in the context of the patient's clinical response and may provide useful information in patients showing poor response, noncompliance, or adverse effects, particularly when lamotrigine is coadministered with other anticonvulsant drugs.

While most patients show response to the drug when the trough concentration is in the range of 3.0 to 15.0 mcg/mL and show signs of toxicity when the peak serum concentration is greater than 20 mcg/mL, some patients can tolerate peak concentrations as high as 70 mcg/mL.

Cautions

Serum separator tube is acceptable but serum must be removed from gel within 24 hours of collection.

Clinical Reference

1. Milone MC, Shaw LM. Therapeutic drugs and their management. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:420-453
2. Johannessen SI, Battino D, Berry DJ, et al. Therapeutic drug monitoring of the newer antiepileptic drugs. Ther Drug Monit. 2003;25(3):347-363. doi:10.1097/00007691-200306000-00016
3. Johannessen SI, Landmark CJ. Value of therapeutic drug monitoring in epilepsy. Expert Rev Neurother. 2008;8(6):929-939. doi:10.1586/14737175.8.6.929
4. Johannessen SI, Tomson T. Pharmacokinetic variability of newer antiepileptic drugs: When is monitoring needed? Clin Pharmacokinet. 2006;45(11):1061-1075. doi:10.2165/00003088-200645110-00002
5. Physician's Desk Reference. 71st ed. Thomson PDR; 2017
6. Hardman JG, Limbird LE, Gilman AG, eds. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 10th ed. McGraw-Hill Book Company; 2001
7. Hiemke C, Bergemann N, Clement HW, et al. Consensus guidelines for therapeutic drug monitoring in neuropsychopharmacology: Update 2017. Pharmacopsychiatry. 2018;51(1-02):9-62. doi:10.1055/s-0043-116492

Performance

Method Description

Samples are diluted and extracted online by high turbulence liquid chromatography with detection by tandem mass spectrometry.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 days

Specimen Retention Time

14 days

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

80175

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
LAMO	Lamotrigine, S	6948-4

Result ID	Test Result Name	Result LOINC® Value
80999	Lamotrigine, S	6948-4