MAYO CLINIC LABORATORIES

Test Definition: DIA

Diazepam and Metabolites, Serum

Overview

Useful For

Assessing compliance

Monitoring for appropriate therapeutic level

Assessing diazepam toxicity

Method Name

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

NY State Available

Yes

Specimen

Specimen Type

Serum Red

Specimen Required

Supplies: Sarstedt Aliquot Tube, 5 mL (T914)
Collection Container/Tube: Red top (Serum gel/SST are **not acceptable**)
Submission Container/Tube: Plastic vial
Specimen Volume: 1 mL
Collection Instructions: Centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume

0.3 mL

Reject Due To

Gross hemolysis	OK
Gross lipemia	OK
Gross icterus	OK

Specimen Stability Information

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

Clinical & Interpretive

Clinical Information

Diazepam, a benzodiazepine derivative, is an anxiolytic agent that reduces neuronal depolarization resulting in decreased action potentials. It enhances the action of gamma-aminobutyric acid (GABA) by tightly binding to A-type GABA receptors, thus opening the membrane channels, and allowing the entry of chloride ions. It is also used as a muscle relaxant, procedural sedation agent, and sedative-hypnotic agent to treat withdrawal states (ie, ethanol), along with other conditions (seizures).

Diazepam is metabolized to several metabolites in the liver, including temazepam, oxazepam, and nordiazepam (desmethyldiazepam), and the clearance of the drug is reduced considerably in older individuals and in patients with hepatic disease.

Therapeutic assessment typically includes measurement of both the parent drug (diazepam) and the active metabolite (nordiazepam).

Reference Values

Therapeutic concentrations
Diazepam: Not established
Diazepam and Nordiazepam: 100-2,500 ng/mL

Cutoff concentrations by liquid chromatography tandem mass spectrometry:
Diazepam: 10 ng/mL
Nordiazepam: 10 ng/mL
Oxazepam: 10 ng/mL
Temazepam: 10 ng/mL

Interpretation

For seizures:
Serum concentrations are not usually monitored during early therapy because response to the drug can be monitored clinically as seizure control. If seizures resume despite adequate therapy, another anticonvulsant must be considered.

Toxicity is commonly seen when diazepam plus nordiazepam concentrations exceed 3000 ng/mL. Adverse effects of benzodiazepines in therapeutic doses usually reflect the drug's pharmacology and include sedation, slurred speech, and ataxia. Respiratory depression/arrest may occur with large overdoses or following rapid intravenous injection with short-acting benzodiazepines.

Cautions

No significant cautionary statements

Clinical Reference

1. Langman LJ, Bechtel LK, Holstege CP. Clinical toxicology. In: Rifai N, Chiu RWK, Young I, Burnham CAD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 43
2. 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

Performance

Method Description

The internal standard mixture containing chlordiazepoxide-d5, diazepam-d5 , nordiazepam-d5, oxazepam-d5, and temazepam-d5 is added to serum samples, mixed, and centrifuged. The supernatant is diluted and injected on a liquid chromatography tandem mass spectrometer.(Unpublished Mayo method)

PDF Report

No

Day(s) Performed

Wednesday

Report Available

3 to 7 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

80299

LOINC® Information

Test Definition: DIA

Diazepam and Metabolites, Serum

Test ID	Test Order Name	Order LOINC® Value
DIA	Diazepam and metabolites, S	49044-1

Result ID	Test Result Name	Result LOINC® Value
8629	Diazepam	3548-5
2475	Nordiazepam	3537-8
2459	Diazepam and Nordiazepam	16757-7
622868	Oxazepam	3886-9
622869	Temazepam	10343-2