MAYO CLINIC LABORATORIES

Test Definition: PENTS

Pentobarbital, Serum

Overview

Useful For
Monitoring of pentobarbital therapy treatment

Method Name
Gas Chromatography Mass Spectrometry (GC-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: 1.5 mL
Collection Instructions:
1. Draw blood immediately before the next scheduled dose.
2. Within 2 hours of collection 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
0.6 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

Pentobarbital is a short-acting barbiturate with anticonvulsant and sedative-hypnotic properties. Uses include sedation induction, relief of preoperative anxiety, control of status epilepticus or seizures resulting from meningitis, tetanus, alcohol withdrawal, poisons, chorea, or eclampsia, and induction of coma in the management of cerebral ischemia and increased intracranial pressure that may follow stroke or head trauma.(1,2)

Pentobarbital is administered orally, parenterally, and rectally. The duration of hypnotic effect is about 1 to 4 hours. The drug distributes throughout the body with about 35% to 45% of a dose bound to plasma proteins in the blood. Metabolism takes place in the liver via oxidation to the inactive metabolite, hydroxypentobarbital. Elimination is biphasic; half-life is about 4 hours in the first phase, and 35 to 50 hours in the second phase. Excretion occurs through the urine, mainly as glucuronide conjugates of metabolites, with only about 1% excreted as unchanged drug.(1,2) Tolerance to the hypnotic effects of pentobarbital occurs after about 2 weeks of continuous dosing.

Reference Values

Therapeutic range
Hypnotic: 1.0-5.0 mcg/mL
Therapeutic coma: 20-50 mcg/mL
Reducing intracranial pressure: 30-40 mcg/mL
This degree of sedation requires artificial respiratory support.
Toxic concentration: >10 mcg/mL

Cutoff concentrations by gas chromatography mass spectrometry:
Pentobarbital: 0.5 ng/mL

Interpretation

Pentobarbital concentrations above 10 mcg/mL have been associated with toxicity. Therapeutic concentrations when used as a hypnotic are 1 to 5 mcg/mL, while concentrations between 20 and 50 mcg/mL are used for therapeutic pentobarbital coma to help control intracranial pressure.

Cautions

The concentration at which toxicity occurs varies and results should be interpreted in light of clinical situation.

Specimens collected in serum gel tubes are not acceptable because the drug can absorb on the gel and lead to falsely decreased concentrations.

Clinical Reference

1. NEMBUTAL Sodium Solution (pentobarbital sodium injection). Package insert: Ovation Pharmaceuticals Inc; October 2007
2. 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
3. Baselt RC. Disposition of toxic drugs and chemical in man. 12th ed. Biomedical Publications; 2020
4. 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
5. Mihic SJ, Mayfield J. Hypnotics and sedatives. In: Brunton LL, Knollmann BC, eds. Goodman and Gilman's: The Pharmacological Basis of Therapeutics. 14th ed. McGraw-Hill Education; 2023

Performance

Method Description
Barbiturates are extracted from serum using solid-phase extraction techniques. The serum is buffered and eluted with organic solvent. The organic phase is dried, reconstituted, and the analysis performed by gas chromatography-mass spectrometry using selected ion monitoring. The assay utilizes deuterated barbiturates as internal standards.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Thursday

Report Available
3 to 9 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 ID	Test Order Name	Order LOINC® Value
PENTS	Pentobarbital, S	3924-8

Result ID	Test Result Name	Result LOINC® Value
8239	Pentobarbital, S	3924-8