MAYO CLINIC LABORATORIES

Test Definition: LID

Lidocaine, Serum

Overview

Useful For

Assessing optimal lidocaine dosing during the acute management of ventricular arrhythmias following myocardial infarction or during cardiac manipulation such as surgery

Assessing potential lidocaine toxicity

Method Name

Enzyme-Multiplied Immunoassay Technique (EMIT)

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: 0.5 mL Serum
Collection Instructions: Within 2 hours of collection, centrifuge and aliquot serum into a plastic vial.

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Cardiovascular Test Request (T724)
-Therapeutics Test Request (T831)

Specimen Minimum Volume

Serum: 0.25 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum Red	Refrigerated (preferred)	14 days	
	Ambient	14 days	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

Lidocaine is commonly used as a local anesthetic, but it is also effective at controlling ventricular arrhythmia and ventricular fibrillation in children and adults. For cardiac therapy, optimal therapeutic response is seen when serum concentrations are between 1.5 and 5.0 mcg/mL. Lidocaine is protein-bound (60-80%), primarily to alpha-1-acid glycoprotein; concentrations of this protein increase after myocardial infarction, which may decrease the amount of free lidocaine and, thus, its efficacy.

Lidocaine undergoes extensive first-pass hepatic metabolism and, therefore, is not administered orally. It is eliminated via renal clearance, with a half-life of approximately 1.5 to 2 hours. Diseases that reduce hepatic or renal function reduce clearance and prolong elimination of lidocaine.

Toxicity occurs when the serum concentration of lidocaine is greater than 6.0 mcg/mL and is usually associated with symptoms of central nervous system excitation, light-headedness, confusion, dizziness, tinnitus, and blurred or double vision. This can be accompanied by bradycardia and hypotension leading to cardiovascular collapse.

Reference Values

Therapeutic: 1.5-5.0 mcg/mL
Critical value: >6.0 mcg/mL

Interpretation

Optimal response to lidocaine occurs when the serum concentration is between 1.5 and 5.0 mcg/mL.

Toxicity is more likely when concentrations exceed 6.0 mcg/mL.

Cautions

No significant cautionary statements

Clinical Reference

1. Milone MC, Shaw LM. Therapeutic drugs and their management. In: Rifai N, Chiu RWK, Young I, Burnham C-AD, Wittwer CT, eds. Tietz Textbook of Laboratory Medicine. 7th ed. Elsevier; 2023:chap 42
2. Brunton LL, Knollmann BC, eds. Goodman and Gilman's: The Pharmacological Basis of Therapeutics, 14th ed. McGraw-Hill Education; 2023

Performance

Method Description

The enzyme-multiplied immunoassay technique assay is a homogeneous enzyme immunoassay technique used for the analysis of specific compounds in biological fluids. The assay is based on competition between drug in the sample and drug labeled with the enzyme glucose-6-phosphate dehydrogenase (G6PD) for antibody binding sites. Enzyme activity decreases upon binding to the antibody, so the drug concentration in the sample can be measured in terms of enzyme activity. Active enzyme converts oxidized nicotinamide adenine dinucleotide (NAD) to NADH, resulting in an absorbance change, which is measured spectrophotometrically. Endogenous serum G6PD does not interfere because the coenzyme functions only with the bacterial (*Leuconostoc mesenteroides*) enzyme employed in the assay.(Package insert: EMIT Lidocaine Assay. Siemens Healthcare Diagnostics, Ltd; 11/2024)

PDF Report
No

Day(s) Performed
Monday through Saturday

Report Available
Same day/1 to 2 days

Specimen Retention Time
2 weeks

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 has been cleared, approved, or is exempt by the US Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information
80176

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
LID	Lidocaine, S	3714-3

Result ID	Test Result Name	Result LOINC® Value

8382	Lidocaine, S	3714-3