MAYO CLINIC LABORATORIES

Test Definition: ETGL

Ethylene Glycol, Serum

Overview

Useful For
Confirming and monitoring ethylene glycol toxicity

Method Name
Gas Chromatography with Flame Ionization Detection (GC-FID)

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 tubes are **not** acceptable)
Submission Container/Tube: Plastic vial
Specimen Volume: 2 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 a Therapeutics Test Request (T831) with the specimen.

Specimen Minimum Volume
Serum: 0.3 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	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

Ethylene glycol is present in antifreeze products, deicing products, detergents, paints, and cosmetics. Ethylene glycol has initial central nervous system (CNS) effects resembling those of ethanol and may be ingested accidentally or for the purpose of inebriation or suicide. Ethylene glycol itself is relatively nontoxic, however, metabolism of ethylene glycol by alcohol dehydrogenase results in the formation of a number of acid metabolites including oxalic acid and glycolic acid. These acid metabolites are responsible for much of the toxicity of ethylene glycol.

Clinically, poisoning has historically been divided into three stages, although timing may vary, and stages may overlap. The first stage typically begins 30 minutes to 12 hours after ingestion due to the intoxicating effects of the ethylene glycol and may range from mild CNS depression to coma. The second stage begins 12 to 24 hours after ingestion and is characterized by severe metabolic acidosis, due to the accumulation of acid metabolites. The third stage occurs 24 to 72 hours after ingestion and is characterized by kidney failure due to calcium oxalate crystal deposition in the proximal tubules.

Ethylene glycol toxicity can be treated with 4-methylpyrazole (4-MP; fomepizole) or ethanol by competitively inhibiting alcohol dehydrogenase and thereby preventing conversion of ethylene glycol to its toxic metabolites.

Reference Values

Toxic concentration: > or =20 mg/dL

Interpretation

Toxic concentrations are those greater than or equal to 20 mg/dL.

Cautions

Propionic acid produced in the rare inborn error of metabolism methylmalonic acidemia may be confused with ethylene glycol in the gas chromatographic assay.

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

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; 2023:454-454.e484
2. Baselt RC. Disposition of Toxic Drugs and Chemical in Man. 12th ed. Biomedical Publications; 2020
3. Cohen JP, Quan D. Alcohols. In: Tintinalli JE, Ma OJ, Yealy DM, et al, eds. Tintinalli's Emergency Medicine: A Comprehensive Study Guide, 9th ed. McGraw-Hill Education; 2020

Performance

Method Description
Ethylene glycol is quantitated in serum by precipitating serum protein with methanol. The supernatant is analyzed by gas chromatography with flame ionization detection.(Unpublished Mayo method)

PDF Report
No

Day(s) Performed
Monday through Sunday

Report Available
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 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
G0480
80320 (if appropriate for select payers)
Clinical Toxicology CPT Code Client Guidance

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
ETGL	Ethylene Glycol, S	5646-5

Result ID	Test Result Name	Result LOINC® Value
8749	Ethylene Glycol, S	5646-5