Test Definition: CAFF

Caffeine, S

Overview

Useful For

Monitoring caffeine therapy in neonates

Assessing caffeine toxicity in neonates

Method Name

Enzyme Multiplied Immunoassay Technique (EMIT)

NY State Available

Yes

Specimen

Specimen Type

Serum

Specimen Required

Collection Container/Tube:

Preferred: Serum gel

Acceptable: Red top

Submission Container/Tube: Plastic vial

Specimen Volume: 0.5 mL

Collection Instructions:

1. Serum gel tubes should be centrifuged within 2 hours of collection.

2. Red-top tubes should be centrifuged and the serum aliquoted into a plastic vial within 2 hours of collection.

Forms

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

Specimen Minimum Volume

0.25 mL

Reject Due To

Gross hemolysis	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum	Frozen (preferred)	28 days	
	Ambient	72 hours	
	Refrigerated	72 hours	

Clinical and Interpretive

Clinical Information

Caffeine is used to treat apnea of prematurity that occurs in newborn infants, the most frequent complication seen in the neonatal nursery.

In neonates, caffeine has a half-life that ranges from approximately 3 to 4 days, which is much longer than in adults (typically 4-6 hours) due to the immaturity of the neonatal liver. This requires that small doses be administered at much longer intervals than would be predicted based on adult pharmacokinetics.

The volume of distribution of caffeine is 0.8-0.9 L/kg (infants) or 0.6 L/kg (adults) and the drug is approximately 36% protein bound.

Toxicity observed in neonates is characterized by central nervous system and skeletal muscle stimulation and bradycardia. These symptoms are seen in adults at lower levels than in neonates, suggesting that neonates have much greater tolerance to the drug.

Reference Values

Therapeutic: 8.0-20.0 mcg/mL

Critical value: > or =30.0 mcg/mL

Interpretation

Optimal pharmacologic response occurs when the serum level is in the range of 8.0 to 20.0 mcg/mL.

Toxicity in neonates and adults may be seen when the serum level is above 20.0 mcg/mL.

Cautions

This assay is not intended to detect levels in adults.

Clinical Reference

1. Milone MC, Shaw LM: Therapeutic drugs and their management. In: Rifai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics, Elsevier; 2018:800-831

2. Brunton LL, Hilal-Dandan R, Knollmann BC, eds. Goodman and Gilman's: The Pharmacological Basis of Therapeutics. McGraw-Hill; 2018

3. Ou CN, Frawley VL: Concurrent measurement of theophylline and caffeine in neonates by an interference-free liquid-chromatographic method. Clin Chem. 1983;29:1934-1936

Performance

Method Description

The enzyme-multiplied immunoassay technique (EMIT) 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 that can be 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: Seimens Caffeine Reagent. Seimens Healthcare Diagnostics, Ltd; 03/2015)

PDF Report

No

Day(s) Performed

Monday through Saturday

Report Available

Same day/1 day

Specimen Retention Time

2 weeks

Performing Laboratory Location

Rochester

Fees and 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 Regional Manager. For assistance, contact Customer Service.

Test Classification

This test has been modified from the manufacturer's instructions. Its performance characteristics were determined by Mayo Clinic in a manner consistent with CLIA requirements. This test has not been cleared or approved by the U.S. Food and Drug Administration.

CPT Code Information

80155

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
CAFF	Caffeine, S	In Process

Result ID	Test Result Name	Result LOINC Value
8754	Caffeine, S	3422-3