MAYO CLINIC LABORATORIES

Test Definition: CAI

Calcium, Ionized, Serum

Overview

Useful For

Assessing calcium states during liver transplantation surgery, cardiopulmonary bypass, or any procedure requiring rapid transfusion of whole blood in neonates and critically ill patients

Second-order test in the evaluation of patients with abnormal calcium values

Method Name

Ion-Selective Electrode (ISE)

NY State Available

Yes

Specimen

Specimen Type

Serum SST

Specimen Required

Container/Tube: Serum gel or serum gel microtainer

Specimen Volume: Full tube

Collection Instructions:

1. Allow blood to clot for 30 minutes.
2. Serum gel tube/microtainer must be centrifuged within 1 hour of collection. Centrifuge with stopper in place for 7 minutes at 3000 rpm to ensure that the gel barrier separates the serum and cells.
3. **Keep specimen anaerobic; do not aliquot.**
4. **Test cannot be combined with other testing. Separate specimens must be submitted when multiple tests are ordered.**

Forms

If not ordering electronically, complete, print, and send a Kidney Transplant Test Request with the specimen.

Specimen Minimum Volume

1.75 mL in a 3.5 mL (50% full) in serum gel tube or 1 full serum gel microtainer

Reject Due To

Gross hemolysis	Reject
Tubes less than 50% full	Reject

Specimens that have been aliquoted, opened, or poorly centrifuged	

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Serum SST	Refrigerated	7 days	SERUM GEL TUBE

Clinical & Interpretive

Clinical Information

Ionized calcium, which accounts for 50% to 55% of total calcium, is the physiologically active form of calcium.

Low ionized calcium values are often seen in kidney disease, critically ill patients, or patients receiving rapid transfusion of citrated whole blood or blood products.

Increased serum ionized calcium concentrations may be seen with primary hyperparathyroidism, ectopic parathyroid hormone-producing tumors, excess intake of vitamin D, or various malignancies.

Nomograms have been used to calculate ionized calcium from total calcium, albumin, and pH values. However, calculated ionized calcium results have proven to be unsatisfactory. A Mayo study of 114 patients found significant differences between ionized and total calcium in 26% of patients.

Reference Values

IONIZED CALCIUM
< or =13 days old: Not established
14 days-<1 year: 5.21-5.99 mg/dL
1-<2 years: 5.04-5.84 mg/dL
2-<3 years: 4.87-5.67 mg/dL
3-23 years: 4.83-5.52 mg/dL
24-97 years: 4.57-5.43 mg/dL
> or =98 years: Not established

pH
< or =13 days old: Not established
14 days-97 years old: 7.35-7.48
> or =98 years old: Not established

For International System of Units (SI) conversion for Reference Values, see www.mayocliniclabs.com/order-tests/si-unit-conversion.html.

Interpretation

Serum ionized calcium concentrations 50% below normal will result in severely reduced cardiac stroke work. With moderate to severe hypocalcemia, left ventricular function may be profoundly depressed.

Ionized calcium values are higher in children and young adults.

Ionized calcium result has been adjusted to pH 7.40 to account for changes in specimen pH that may occur during transport. Ionized calcium concentration increases approximately 0.2 mg/dL per 0.1 pH unit decrease.

Cautions

Proper specimen handling is necessary to ensure accurate results.

Clinical Reference

Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018

Performance

Method Description

The pH and ionized calcium sensors in the GEM Premier 3500 Analyzer are based on the principle of ion-selective electrodes; that is, an electrical potential can be established across a membrane that is selectively permeable to a specific ion.(Instruction manual: GEM Premier 3500 Analyzer Operator's Guide. Instrumentation Laboratory; 03/2015)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 day

Specimen Retention Time

7 days

Performing Laboratory Location

Mayo Clinic Laboratories - Rochester Main Campus

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 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 US Food and Drug Administration.

CPT Code Information

82330

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CAI	Calcium, Ionized, S	57333-7

Result ID	Test Result Name	Result LOINC® Value
CAIS	Calcium, Ionized, S	57333-7
PHCC	pH	2753-2