



Test Definition: RAT10

Citrate/Creatinine Ratio, Urine

Overview

Useful For

Calculating the citrate concentration per creatinine

Diagnosing risk factors for patients with calcium kidney stones

Monitoring results of therapy in patients with calcium stones or renal tubular acidosis

Method Name

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

Calculation

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

Specimen Minimum Volume

1 mL

Reject Due To

All specimens will be evaluated at Mayo Clinic Laboratories for test suitability.

Specimen Stability Information

| Specimen Type | Temperature | Time | Special Container |
|---------------|--------------------------|---------|-------------------|
| Urine | Refrigerated (preferred) | 14 days | |
| | Frozen | 14 days | |

Clinical & Interpretive

Clinical Information

Urinary citrate is a major inhibitor of kidney stone formation due in part to binding of calcium in urine. Low urine citrate levels are considered a risk for kidney stone formation. Several metabolic disorders are associated with low urine citrate. Any condition that lowers renal tubular pH or intracellular pH may decrease citrate (eg, metabolic acidosis, increased acid ingestion, hypokalemia, or hypomagnesemia).

Low urinary citrate is subject to therapy by correcting acidosis, hypokalemia, or hypomagnesemia by altering diet or using drugs such as citrate and potassium.

Reference Values

Only orderable as part of a profile. For more information see CITRA / Citrate Excretion, Random, Urine.

No established reference values

Interpretation

A low citrate value represents a potential risk for kidney stone formation/growth. Patients with low urinary citrate and new or growing stone formation may benefit from adjustments in therapy known to increase urinary citrate excretion.

Very low citrate levels suggest investigation for the possible diagnosis of metabolic acidosis (eg, renal tubular acidosis).

For children ages 5 to 18, a ratio of less than 0.176 mg citrate/ mg creatinine is below the 5% reference range and considered low.(1)

Cautions

Drugs that lower systemic pH, potassium, and/or magnesium also lower urine citrate and are to be avoided in patients with tendency to form calcium stones. Conversely, drugs that raise systemic pH, potassium, and/or magnesium may raise urine citrate and should be considered when treating patients or interpreting results.

Clinical Reference

1. Srivastava T, Winston MJ, Auron A et al: Urine calcium/citrate ratio in children with hypercalciuric stones. *Pediatr Res.* 2009;66:85-90
2. Hosking DH, Wilson JW, Liedtke RR, et al: The urinary excretion of citrate in normal persons and patients with idiopathic calcium urolithiasis (abstract). *Urol Res.* 1984;12:26
3. Lieske JC, Wang X: Heritable traits that contribute to nephrolithiasis. *Urolithiasis.* 2019 Feb;47(1):5-10
4. Lieske JC, Turner ST, Edeh SN, Smith JA, Kardia SLR: Heritability of urinary traits that contribute to nephrolithiasis. *Clin J Am Soc Nephrol.* 2014 May;9(5):943-950. doi: 10.2215/CJN.08210813

Performance**Method Description**

This test calculates the citrate concentration per creatinine. This calculation is performed in the Laboratory Information system, SCC Soft.

PDF Report

No

Day(s) Performed

Monday through Saturday

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

Not Applicable

CPT Code Information

82507

LOINC® Information

| Test ID | Test Order Name | Order LOINC® Value |
|---------|--------------------------|--------------------|
| RAT10 | Citrate/Creatinine Ratio | 13722-4 |

| Result ID | Test Result Name | Result LOINC® Value |
|-----------|--------------------------|---------------------|
| RAT10 | Citrate/Creatinine Ratio | 13722-4 |