MAYO CLINIC LABORATORIES

Test Definition: RA1U

Alpha-1-Microglobulin, Random, Urine

Overview

Useful For

Assessment of renal tubular injury or dysfunction using random urine specimens

Screening for tubular abnormalities

Detecting chronic asymptomatic renal tubular dysfunction (2)

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
AIMR	Alpha-1-Microglobulin, Random, U	No	Yes
CRETR	Creatinine, Random, U	Yes, (Order RCTUR)	Yes

Method Name

AIMR: Immunonephelometry

CRETR: Enzymatic Colorimetric Assay

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Container/Tube: Plastic, 5-mL tube

Specimen Volume: 5 mL

Collection Instructions:

1. Collect a random urine specimen.
2. No preservative.

Forms

If not ordering electronically, complete, print, and send a Renal Diagnostics Test Request (T830) with the specimen.

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)	7 days	
	Frozen	7 days	

Clinical & Interpretive

Clinical Information

Alpha-1-microglobulin is a low-molecular-weight protein of 26 kDa and a member of the lipocalin protein superfamily.(1) It is synthesized in the liver, freely filtered by glomeruli, and reabsorbed by renal proximal tubules cells where it is catabolized.(1) Due to extensive tubular reabsorption, under normal conditions very little filtered alpha-1-microglobulin appears in the final excreted urine. Therefore, an increase in the urinary concentration of alpha-1-microglobulin indicates proximal tubule injury and/or impaired proximal tubular function.

Elevated excretion rates can indicate tubular damage associated with renal tubulointerstitial nephritis or tubular toxicity from heavy metal or nephrotoxic drug exposure. Glomerulonephropathies and renal vasculopathies also are often associated with coexisting tubular injury and so may result in elevated urinary alpha-1-microglobulin excretion. Elevated alpha-1-microglobulin in patients with urinary tract infections may indicate renal involvement (pyelonephritis). Measurement of urinary excretion of retinol-binding protein, another low-molecular-weight protein, is an alternative to the measurement of alpha-1-microglobulin. To date, there are no convincing studies to indicate that one test has better clinical utility than the other.

Urinary excretion of alpha-1-microglobulin can be determined from either a 24-hour collection or from a random urine collection. The 24-hour collection is traditionally considered the gold standard. For random or spot collections, the concentration of alpha-1-microglobulin is divided by the urinary creatinine concentration. This corrected value adjusts alpha-1-microglobulin for variabilities in urine concentration.

Reference Values

> or =18 years: <35 mg/g creatinine
Reference values have not been established for patients who are less than 18 years of age.

Interpretation

Alpha-1-microglobulin above the reference values may indicate a proximal tubular dysfunction. As suggested in the literature, 7 mg/g creatinine is an upper reference limit for pediatric patients of 1 month to 15 years of age.(3)

Cautions

Since this is a nephelometric assay, turbidity and particles (eg, cells, crystals) in the sample can interfere with the test. Therefore, all urine specimens should be centrifuged at ambient temperature prior to assay.

Clinical Reference

1. Akerstrom B, Logdberg L, Berggard T, Osmark P, Lindqvist A: Alpha(1)-microglobulin: a yellow-brown lipocalin. Biochim Biophys Acta. 2000 Oct 18;1482(1-2):172-184
2. Yu H, Yanagisawa Y, Forbes M, Cooper EH, Crockson RA, MacLennan RC: Alpha-1-microglobulin: an indicator protein for renal tubular function. J Clin Pathol. 1983 Mar;36(3):253-259
3. Hjorth L, Helin I, Grubb A: Age-related reference limits for urine levels of albumin, orosomucoid, immunoglobulin G, and protein HC in children. Scand J Clin Lab Invest. 2000 Feb;60(1):65-73
4. Pagana K, Pagana T, Papana T, eds: Mosby's Diagnostic and Laboratory Test Reference. Mosby; 2020:632

Performance

Method Description

Alpha-1-Microglobulin:
In an immunochemical reaction, alpha-1-microglobulin present in the urine sample forms immune complexes with anti-alpha-1-microglobulin-specific antibodies. These complexes scatter a beam of light passed through the sample. The intensity of the scattered light is proportional to the concentration of alpha-1-microglobulin in the sample. The result is evaluated by comparison with a standard of known concentration.(Package insert: N Alpha-1-microglobulin. Siemens; V5, 05/2018)

Creatinine:
Creatinine is performed by the enzymatic method, which is based on the determination of sarcosine from creatinine with the aid of creatininase, creatinase, and sarcosine oxidase. The liberated hydrogen peroxide is measured via a modified Trinder reaction using a colorimetric indicator. Optimization of the buffer system and the colorimetric indicator enables the creatinine concentration to be quantified both precisely and specifically.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V15.0, 03/2019)

PDF Report

No

Day(s) Performed

Varies

Report Available

1 to 7 days

Specimen Retention Time

7 days

Performing Laboratory Location

Rochester

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

83883

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
RA1U	Alpha-1-Microglobulin, Random, U	48415-4

Result ID	Test Result Name	Result LOINC® Value
A1M_U	Alpha-1-Microglobulin, Random, U	46723-3
A1M_R	A1M/Creat Ratio	48415-4
CRETR	Creatinine, Random, U	2161-8