Test Definition: RPTU

Protein/Creatinine Ratio, Random, U

Overview

Useful For

Evaluation of renal disease

Screening for monoclonal gammopathy

Method Name

Turbidimetry

NY State Available

Yes

Specimen

Specimen Type

Urine

Specimen Required

Patient Preparation: Collect specimen either prior to fluorescein administration or wait to collect for at minimum of 24 hours after administration.

Supplies: Aliquot Tube, 5 mL (T465)

Container/Tube: Plastic, 5-mL tube

Specimen Volume: 4 mL

Collection Instructions:

1. Collect a random urine specimen.

2. No preservative.

3. Invert well before taking 4 mL aliquot.

4. Do not overfill aliquot tube, maximum 4 mL.

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)	14 days	
	Frozen	14 days	
	Ambient	24 hours	

Clinical and Interpretive

Clinical Information

Protein in urine is normally composed of a combination of plasma-derived proteins that have been filtered by glomeruli and have not been reabsorbed by the proximal tubules and proteins secreted by renal tubules or other accessory glands.

Increased amounts of protein in the urine may be due to:

-Glomerular proteinuria: caused by defects in permselectivity of the glomerular filtration barrier to plasma proteins (eg, glomerulonephritis or nephrotic syndrome)

-Tubular proteinuria: caused by incomplete tubular reabsorption of proteins (eg, interstitial nephritis)

-Overflow proteinuria: caused by increased plasma concentration of proteins (eg, multiple myeloma, myoglobinuria)

Reference Values

<0.18 mg/mg creatinine

Reference values have not been established for patients <18 years of age.

Interpretation

Total protein of greater than 500 mg/24 hours should be evaluated by immunofixation to determine if a monoclonal immunoglobulin light chain is present and, if so, identify it as either kappa or lambda type.

Urinary protein levels may rise to 300 mg/24 hours in healthy individuals after vigorous exercise.

Low-grade proteinuria may be seen in inflammatory or neoplastic processes involving the urinary tract.

In a random urine specimen, a protein:creatinine or protein:osmolality ratio can be used to roughly approximate 24-hour excretion rates. The normal protein-to-osmolality ratio is less than 0.42.(1) For patients younger than 18 years of age no reference range has been established.

Cautions

False proteinuria may be due to contamination of urine with menstrual blood, prostatic secretions, or semen.

Normal newborn infants may have higher excretion of protein in urine during the first 3 days of life.

The presence of hemoglobin elevates protein concentration.

Protein electrophoresis and immunofixation may be required to characterize and interpret the proteinuria.

Clinical Reference

1. Wilson DM, Anderson RL: Protein-osmolality ratio for the quantitative assessment of proteinuria from a random urinalysis sample. Am J Clin Pathol 1993 Oct;100(4):419-424

2. Morgenstern BZ, Butani L, Wollan P, et al: Validity of protein-osmolality versus protein-creatinine ratios in the estimation of quantitative proteinuria from random samples of urine in children. Am J Kidney Dis 2003 Apr;41(4):760-766

3. Rinehart BK, Terrone DA, Larmon JE, et al: A 12-hour urine collection accurately assesses proteinuria in hospitalized hypertensive gravida. J Perinatol 1999;19:556-558

4. Adelberg AM, Miller J, Doerzbacher M, Lambers DS: Correlation of quantitative protein measurements in 8-, 12-, and 24-hour urine samples for diagnosis of preeclampsia. Am J Obstet Gynecol 2001 Oct;185(4):804-807

5. Robinson RR: Isolated proteinuria in asymptomatic patients. Kidney Int 1980;18:395-406

6. Dube J, Girouard J, Leclerc P, et al: Problems with the estimation of urine protein by automated assays. Clin Biochem 2005;(38):479-485

7. Koumantakis G, Wyndham L: Fluorescein Interference with Urinary Creatinine and Protein Measurements. Clin Chem 1991;37(10):1799

8. Lamb EJ, Jones GRD: Chapter 32: Kidney function tests. In Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. Sixth edition. Edited by N Rafai, AR Horvath, CT Wittwer. Elsevier, 2018, pp 479-517

Performance

Method Description

Protein Method: Turbidimetric method. The sample is preincubated in an alkaline solution containing EDTA, which denatures the protein and eliminates interference from magnesium ions.Benzethonium chloride is then added, producing turbidity.(Package insert: Roche Diagnostics Total Protein Urine/CSF Gen.3)

Creatinine Method: The enzymatic method 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: Roche Diagnostics, Indianapolis IN, 2004)

PDF Report

No

Day(s) and Time(s) Test Performed

Monday through Sunday; Continuously

Analytic Time

Same day/1 day

Maximum Laboratory Time

Same day/1 day

Specimen Retention Time

7 days

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 cleared or approved by the U.S. Food and Drug Administration and is used per manufacturer's instructions. Performance characteristics were verified by Mayo Clinic in a manner consistent with CLIA requirements.

CPT Code Information

84156

82570

LOINC® Information

Test ID	Test Order Name	Order LOINC Value
RPTU	Protein/Creatinine Ratio, Random, U	87434-7

Result ID	Test Result Name	Result LOINC Value
PTCON	Protein, Total, Random, U	2888-6
CREA4	Creatinine Concentration	2161-8
RATO3	Protein/Creatinine Ratio	2890-2