MAYO CLINIC LABORATORIES

Test Definition: CRBF

Creatinine, Body Fluid

Overview

Useful For

Identifying the presence of urine as a cause for accumulation of fluid in a body compartment

Measuring the ultrafiltration capacity of the peritoneal membrane in patients receiving peritoneal dialysis

Method Name

Enzymatic

NY State Available

Yes

Specimen

Specimen Type

Body Fluid

Necessary Information

1. Date and time of collection are required.

2. Specimen source is required.

Specimen Required

Specimen Type: Body fluid

Preferred Source:

-Peritoneal fluid (peritoneal, abdominal, ascites, paracentesis)

-Pleural fluid (pleural, chest, thoracentesis)

-Drain fluid (drainage, JP drain)

-Peritoneal dialysate (dialysis fluid)

-Pericardial

Acceptable Source: Write in source name with source location (if appropriate)

Collection Container/Tube: Sterile container

Submission Container/Tube: Plastic vial

Specimen Volume: 1 mL

Collection Instructions:

1. Centrifuge to remove any cellular material and transfer into a plastic vial.
2. Indicate the specimen source and source location on label.

Forms

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

Specimen Minimum Volume

0.5 mL

Reject Due To

Gross hemolysis	Reject
Gross lipemia	Reject
Gross icterus	Reject
Anticoagulant or additive Breast milk Nasal secretions Gastric secretions Bronchoalveolar lavage (BAL) or bronchial washings Colostomy/ostomy Feces Urine Saliva Sputum Vitreous fluid	Reject

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Body Fluid	Refrigerated (preferred)	7 days	
	Ambient	24 hours	
	Frozen	30 days	

Clinical & Interpretive

Clinical Information

Byproducts of nitrogen metabolism are present in high concentration in urine compared to blood and serve as a surrogate marker for the identification of urine leakage into a body compartment. Concentrations of creatinine or urea nitrogen that exceed the concentration found in a concurrent sample of blood are suggestive of the presence of urine.(1)

Peritoneal, abdominal, pelvic drain fluid:
Trauma as well as abdominal or pelvic surgery can lead to bladder perforation or formation of urinary fistula with

excessive accumulation of peritoneal fluid or increased surgical drain output caused by intraperitoneal urinary leakage.(1,2)

Pleural fluid:
Urinoma describes the accumulation of urine in the perirenal and retroperitoneal spaces caused by genitourinary tract injury due to trauma or blockage of the urinary tract due to stones, strictures, tumors, benign prostate hypertrophy, etc.(3) Rarely, this fluid can translocate to the pleural cavity causing pleural effusion via movement of urine through the diaphragm or via lymphatic communication between retroperitoneal and pleural spaces caused by increased pressure due to urinoma. Urinothorax is the term used to describe an accumulation of urine in the pleural space. Patients often develop symptoms of dyspnea, chest pain, abdominal pain, and reduced diuresis.(4) The condition is reversed when treatment is directed to correct the primary cause (trauma in 75% and obstruction in 24% of cases). The pleural fluid to serum creatinine ratio is above 1 in 97.9% of cases (n=48; median ratio=2.9, range=0.95-16).

Peritoneal dialysis fluid:
Peritoneal dialysis (PD) is a type of ambulatory dialysis in which hyperosmotic fluid is infused into the patient's peritoneal cavity, with the peritoneum employed as the dialysis membrane promoting the diffusion of small molecules and free water from circulation.(5) The peritoneal equilibration test estimates the rate of small solute transport across the peritoneal membrane and the ultrafiltration capacity. Several analytes may be measured in order to perform this test. Creatinine is measured in PD fluid as well as in plasma or serum in samples taken 2 and/or 4 hours after the dialysate is instilled. The dialysate fluid to serum or plasma creatinine ratio is calculated with larger ratios (approaching 1.0) observed in patients exhibiting faster transport rates.

Reference Values

An interpretive report will be provided.

Interpretation

Peritoneal, pleural, and drain fluid concentrations should be compared to serum or plasma. Fluid to serum ratios above 1.0 suggest the specimen may be contaminated with urine.(1-4)

Peritoneal dialysate fluid to serum creatinine ratios can be calculated from timed collections to determine peritoneal membrane transport rates.(5)

All other fluids: results should be interpreted in conjunction with serum creatinine and other clinical findings.

Cautions

The manufacturer lists the following interfering substances that affect creatinine results for serum testing and are expected to impact body fluid results in a similar manner, when present:
-Rifampicin, levodopa, and calcium dobesilate (eg, Dexium) cause artificially low creatinine results.
-As tested according to CLSI recommendation methyldopa causes artificially low creatinine results.
-Dicynone (Etamsylate) at therapeutic concentrations may lead to falsely low results.
-N-ethylglycine at therapeutic concentrations and DL-proline at concentrations of 1 mmol/L or greater (> or =115 mg/L) give falsely high results.
-2-Phenyl-1,3-indandion (Phenindion) at therapeutic concentrations interferes with the assay.
-In patients receiving catecholamines (dopamine, dobutamine, epinephrine, and norepinephrine) falsely low results might be observed.

Results can be falsely decreased in patients with elevated levels of N-acetyl-p-benzoquinone imine (NAPQI, a metabolite of acetaminophen), N-acetylcysteine, and metamizole.

In very rare cases, gammopathy, in particular type IgM (Waldenstrom macroglobulinemia), may cause unreliable results.

Clinical Reference

1. Manahan KJ, Fanning J. Peritoneal fluid urea nitrogen and creatinine reference values. Obstet Gynecol. 1999;93:780-782
2. Wong MH, Lim SK, Ng KL, Ng KP. Pseudo-acute kidney injury with recurrent ascites due to intraperitoneal urine leakage. Intern Med J. 2012;42(7):848-849
3. Austin A, Jogani SN, Brasher PB, Argula RG, Huggins JT, Chopra A. The urinothorax: A comprehensive review with case series. Am J Med Sci. 2017;354(1):44-53
4. Toubes ME, Lama A, Ferreiro L, et al. Urinothorax: a systematic review. J Thorac Dis. 2017;9(5):1209-1218
5. Block DR, Florkowski CM. Body fluids. In: Rafai N, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018: chap 43
6. Saenger AK, Lockwood C, Snozek CL, et al. Catecholamine interference in enzymatic creatinine assays. Clin Chem. 2009;55(9):1732-1736

Performance

Method Description

This enzymatic method is based on the conversion of creatinine with the aid of creatininase, creatinase, and sarcosine oxidase to glycine, formaldehyde, and hydrogen peroxide. Catalyzed by peroxidase the liberated hydrogen peroxide reacts with 4-aminophenazone and 2,4,6-triiodo-3-hydroxybenzoic acid to form a quinone imine chromogen. The color intensity of the quinone imine chromogen formed is directly proportional to the creatinine concentration in the reaction mixture.(Package insert: Creatinine plus ver 2. Roche Diagnostics; V16.0, 02/2022)

PDF Report

No

Day(s) Performed

Monday through Sunday

Report Available

Same day/1 to 2 days

Specimen Retention Time

1 week

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

82570

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
CRBF	Creatinine, BF	12190-5

Result ID	Test Result Name	Result LOINC® Value
CR_BF	Creatinine, BF	12190-5
FLD13	Fluid Type, Creatinine	14725-6