MAYO CLINIC LABORATORIES

Test Definition: OSM24

Osmolality, 24 Hour, Urine

Overview

Useful For
Assessing the concentrating and diluting ability of the kidney using a 24-hour urine collection

Method Name
Freezing Point Depression

NY State Available
Yes

Specimen

Specimen Type
Urine

Necessary Information
24-Hour volume (in milliliters) is required.

Specimen Required
Supplies:
-Diazolidinyl Urea (Germall), 5.0 mL (T822)
-Urine Tubes, 10 mL (T068)
Container/Tube: 24-hour graduated urine container with no metal cap or glued insert
Specimen Volume: 10 mL
Collection Instructions:
1. Collect urine for 24 hours
2. Add 5 mL of diazolidinyl urea as preservative at start of collection or refrigerate specimen during and after collection.
Additional Information: See Urine Preservatives-Collection and Transportation for 24-Hour Urine Specimens for multiple collections.

Urine Preservative Collection Options
Note: The addition of preservative or application of temperature controls must occur at the beginning of the collection.

Ambient (No additive)	No
Refrigerate (No additive)	Preferred
Frozen (No additive)	OK
50% Acetic Acid	No
Boric Acid	No
Diazolidinyl Urea (Germall)	OK
6M Hydrochloric Acid	No
6M Nitric Acid	No

Sodium Carbonate	No
Thymol	No
Toluene	No

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	
	Ambient	72 hours	
	Frozen	14 days	

Clinical & Interpretive

Clinical Information

Osmolality is an index of the solute concentration. Urine osmolality is a measure of the concentration of osmotically active particles, principally sodium, chloride, potassium, and urea; glucose can contribute significantly to the osmolality when present in substantial amounts in urine. Urinary osmolality corresponds to urine specific gravity in nondisease states.

The ability of the kidney to maintain both tonicity and water balance of the extracellular fluid can be evaluated by measuring the osmolality of the urine either routinely or under artificial conditions. More information concerning the state of renal water handling or abnormalities of urine dilution or concentration can be obtained if urinary osmolality is compared to serum osmolality and urine electrolyte studies are performed. Normally, the ratio of urine osmolality to serum osmolality is 1.0 to 3.0, reflecting a wide range of urine osmolality.

Reference Values

0-11 months: 50-750 mOsm/kg
> or =12 months: 150-1,150 mOsm/kg

Interpretation

With normal fluid intake and normal diet, a patient will produce urine of about 500 to 850 mosmol/kg water. Above the age of 20 years, there is an age dependent decline in the upper reference range of approximately 5 mOsm/kg/year.

The normal kidney can concentrate urine to 800 to 1400 mosmol/kg and with excess fluid intake, a minimal osmolality of 40 to 80 mosmol/kg can be reached.

With dehydration, the urine osmolality should be 3 to 4 times the plasma osmolality

When a patient is drinking relatively large amounts of fluid the urine can be maximally diluted to approximately 100 mosmol/kg water.

A 24-hour urine osmolality will reflect the average urine osmolality over the day. Thus, a 24-hour urine osmolality will provide information regarding patient's ability to either dilute or concentrate the urine, and also their habitual water intake throughout the day in relation to their osmole intake. This information is most commonly used to determine if a patient with a risk of kidney stone disease is ingesting enough fluid to maintain a relatively dilute urine. Rough guidelines would suggest a treatment target of less than 400 mosmol/ kg water in a stone forming individual, which correlates with a total urine volume of greater than 2 L in an average individual.

Cautions

No significant cautionary statements

Clinical Reference

1. Newman D, Price C. Renal function and nitrogen metabolites. In: Burtis CA, Ashwood ER, eds. Tietz Textbook of Clinical Chemistry. 4th ed. WB Saunders Company; 2006
2. Delaney MP, Lamb EJ. Kidney disease. In. Rifai NF, Horvath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:1306

Performance

Method Description

Measurement of the freezing point of urine is the most widely used principle in osmometers. The extent of lowering below 0 degrees C (the freezing point of water) is a function of the concentration of substances dissolved in the urine. By definition, 1 milliosmole per kilogram lowers the freezing point 0.001858 degrees C.(Schindler EI, Brown SM, Scott MG. Electrolytes and blood gases. In: Rifai N, Horwath AR, Wittwer CT, eds. Tietz Textbook of Clinical Chemistry and Molecular Diagnostics. 6th ed. Elsevier; 2018:610-612)

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 cleared, approved, or is exempt by the US 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

83935

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
OSM24	Osmolality, 24 HR, U	2694-8

Result ID	Test Result Name	Result LOINC® Value
UOS24	Osmolality, 24 HR, U	2694-8
TM02	Collection Duration (h)	13362-9
VL02	Volume (mL)	3167-4