MAYO CLINIC LABORATORIES

Test Definition: OSG_F

Osmotic Gap, Feces

Overview

Useful For

Workup of cases of chronic diarrhea

Differentiating osmotic from non-osmotic causes of chronic diarrhea.

Profile Information

Test Id	Reporting Name	Available Separately	Always Performed
NA_F	Sodium, F	No	Yes
K_F	Potassium, F	No	Yes
OG_F	Osmotic Gap, F	No	Yes

Method Name

OG_F: Calculation

NA_F, K_F: Indirect Ion-Selective Electrode (ISE) Potentiometry

NY State Available

Yes

Specimen

Specimen Type

Fecal

Ordering Guidance

This test is **only** clinically valid if performed on watery specimens. In the event a formed fecal specimen is submitted, the test will not be performed.

Specimen Required

Patient Preparation: No barium, laxatives, or enemas may be used for 96 hours prior to start of, or during, collection.

Supplies: Stool containers - 24, 48, 72 Hour Kit (T291)

Collection Container/Tube: Stool container

Specimen Volume: 10 g

Collection Instructions: Collect a very liquid fecal specimen.

Specimen Minimum Volume

5 g

Reject Due To

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

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Fecal	Ambient	48 hours	
	Refrigerated	7 days	
	Frozen (preferred)	14 days	

Clinical & Interpretive

Clinical Information

The concentration of electrolytes in fecal water and their rate of excretion are dependent upon 3 factors:
-Normal daily dietary intake of electrolytes
-Passive transport from serum and other vascular spaces to equilibrate fecal osmotic pressure with vascular osmotic pressure
-Electrolyte transport into fecal water due to exogenous substances and rare toxins (eg, cholera toxin)

Fecal osmolality is normally in equilibrium with vascular osmolality, and sodium is the major effector of this equilibrium.(1) Fecal osmolality is normally 2 x (sodium + potassium) unless there are exogenous factors inducing a change in composition, such as the presence of other osmotic agents (magnesium sulfate, saccharides) or drugs inducing secretions, such as phenolphthalein or bisacodyl.

Osmotic diarrhea is caused by ingestion of poorly absorbed ions or sugars and can be characterized by the following:
-Stool volume typically decreased by fasting
-Fecal fluid usually has an elevated osmotic gap
-Osmotic agents such as magnesium, sorbitol, or polyethylene glycol may be the cause through the intentional or inadvertent use of laxatives
-Carbohydrate malabsorption due most commonly to lactose intolerance
-Carbohydrate malabsorption can be differentiated from other osmotic causes by a low stool pH (<6)

Non-osmotic causes of diarrhea include bile acid malabsorption, inflammatory bowel disease, endocrine tumors, and neoplasia.(1) Secretory diarrhea is classified as non-osmotic and is caused by disruption of epithelial electrolyte transport when secretory agents such as anthraquinones, phenolphthalein, bisacodyl, or cholera toxin are present. The fecal fluid usually has elevated electrolytes (primarily sodium and chloride) and a low osmotic gap (<50 mOsm/kg). Infection is a common secretory process; however, it does not typically cause chronic diarrhea (defined as symptoms >4 weeks).

Reference Values

An interpretive report will be provided

Interpretation

Osmotic Gap:
-Osmotic gap is calculated as 290 mOsm/kg-(2[Na]+2[K]). Typically, stool osmolality is similar to serum since the

gastrointestinal (GI) tract does not secrete water.(1)
-An osmotic gap above 50 mOsm/kg is suggestive of an osmotic component contributing to the symptoms of diarrhea.(1-3)

-Magnesium-induced diarrhea should be considered if the osmotic gap is above 75 mOsm/kg and is likely if the magnesium concentration is over 110 mg/dL.(1)
-An osmotic gap of 50 mOsm/kg or less is suggestive of secretory causes of diarrhea.(1-3)
-A highly negative osmotic gap or a fecal sodium concentration greater than plasma or serum sodium concentrations suggests the possibility of either sodium phosphate or sodium sulfate ingestion by the patient.(4)

Sodium:
-Sodium is typically found at lower concentrations (mean 30 +/- 5 mmol/L) in patients with osmotic diarrhea caused by magnesium-containing laxatives, while typically at higher concentrations (mean 104 +/- 5 mmol/L) in patients known to be taking secretory laxatives.(5)

Sodium and Potassium:
-High sodium and potassium in the absence of an osmotic gap indicate active electrolyte transport in the GI tract that might be induced by agents such as cholera toxin or hypersecretion of vasointestinal peptide.(1)

Cautions

No significant cautionary statements

Clinical Reference

1. Steffer KJ, Santa Ana CA, Cole JA, Fordtran JS: The practical value of comprehensive stool analysis in detecting the cause of idiopathic chronic diarrhea. Gastroenterol Clin North Am. 2012 Sep;41(3):539-560
2. Sweetser S: Evaluating the patient with diarrhea: A case-based approach. Mayo Clin Proc. 2012 Jun;87 (6):596-602
3. Eherer AJ, Fordtran JS: Fecal osmotic gap and pH in experimental diarrhea of various causes. Gastroenterology. 1992 Aug;103(2):545-551
4. Fine KD, Ogunji F, Florio R, Porter J, Ana C: Investigation and diagnosis of diarrhea caused by sodium phosphate. Dig Dis Sci. 1998 Dec; 43(12):2708-2714
5. Phillips S, Donaldson L, Geisler K, Pera A, Kochar R: Stool composition in factitial diarrhea: a 6-year experience with stool analysis. Ann Intern Med. 1995 Jun 30;123(2):97-100
6. Casprary WF: Diarrhea associated with carbohydrate malabsorption. Clin Gastroenterol. 1986;15:631-655

Performance

Method Description

Osmotic Gap:
Calculated result=290 mOsm/kg - 2(stool Na [mmol/L] + stool K [mmol/L])

Sodium and Potassium:
The Roche cobas c 501 analyzer makes use of the unique properties of certain membrane materials to develop an electrical potential (electromotive force: EMF) for the measurements of ions in solution. The electrode has a selective membrane in contact with both the test solution and internal filling solution. The internal filling solution contains the

test ion at a fixed concentration. The membrane EMF is determined by the difference in concentration of the test ion in the test solution and the internal filling solution. The EMF develops according to the Nernst equation for a specific ion in solution.(Package insert: Roche ISE reagent. Roche Diagnostics; V14 02/2018)

PDF Report
No

Day(s) Performed
Monday, Thursday

Report Available
1 to 3 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
84302-Sodium
84999-Potassium

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
OSG_F	Osmotic Gap, F	88697-8

Result ID	Test Result Name	Result LOINC® Value
NA_F	Sodium, F	15207-4
K_F	Potassium, F	15202-5
OG_F	Osmotic Gap, F	73571-2