

אגף המעבדות
מעבדה מטבולית
טלפון: 03-5302553
פקס: 035302552

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Oxalate determination in 24-hour collection urine, quantitative LC MSMS

Useful For

1. Follow-up testing for treatment for kidney stones
2. Identifying reasons for increased urinary oxalate as a risk factor for stone formation
3. Preferred test for diagnosis of primary or secondary hyperoxaluria

Methodology

Liquid chromatography tandem mass spectrometry with Electrospray ionization (ESI) technique.

Clinical Information

Measurement of oxalate in urine is important for the diagnosis of primary hyperoxaluria and the secondary forms resulting from excessive intake or abnormal intestinal absorption of oxalate. The 24-hour urinalysis is a key component of the metabolic workup for recurrent stone formers. Accurate collections can detect treatable abnormalities predisposing to nephrolithiasis, and monitor treatment progress. Oxalate is an end product of glyoxalate and glycerate metabolism. Humans do not have an enzyme capable of degrading oxalate, therefore it must be eliminated by the kidney. Increased urinary oxalate excretion results from inherited enzyme deficiencies (primary hyperoxaluria). In type I, a defect in glyoxalate metabolism is found, leading to increased oxalate synthesis. Excessive quantities of glyoxylic and glycolic acid urinary excretion occur. Type II is rare; it is characterized by excessive urinary excretion of oxalic and L-glyceric acids with normal excretion of glycolic acid.

Further reason for increased level of oxalate are gastrointestinal disorders associated with fat malabsorption, including inflammatory bowel disease, cystic fibrosis, pancreatic insufficiency, or previous bariatric bowel surgery (secondary hyperoxaluria), or increased oral intake of oxalate-rich foods or vitamin C (Ascorbic Acid).

Necessary Information

24-Hour urine volume (in milliliters) is required.

Test order form

Clinical background of patient

Payment document

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The sample should be delivered cold or preferably frozen to the Mega-Lab, laboratory wing, ground floor on week days between the hours 08:00-15:00.

Collection Instructions

1. Add 30 mL 6 M HCL as a preservative at the start of collection and refrigerate specimen during and after collection. Collection container: clean plastic container with plastic cap (no metal cap).
2. Collect urine for 24 hours.
3. Specimen pH should be between 2 and 4 and will stay in this range if kept refrigerated. pH above 8 might indicate bacterial contamination, so testing will be cancelled.

Instruct patient: The patient's first morning urine is not to be collected. Then collect all urine including the next morning first urine in a collection container containing the preservative 6 M HCl. 24-hour collection period in total.

Patient Preparation

Avoid high dosages of vitamin C supplements (more than 2g/orally/24 hr) and vitamin C-rich foods (like, citrus fruits, oranges, orange juice; vegetables like broccoli, tomatoes, peppers, potatoes) for 48 hours prior to collection.

Specimen Volume 5 ml; specimen minimum volume 1 mL

Specimen Stability Information

Frozen (preferred) 40 days at -20 °C
Refrigerated 7 days

Interpretation

An elevated urine oxalate may suggest disease states such as secondary hyperoxaluria (fat malabsorption), primary hyperoxaluria (alanine glyoxalate transferase enzyme deficiency, glyceric dehydrogenase deficiency), idiopathic hyperoxaluria, or excess dietary oxalate or vitamin C intake.

In stone-forming patients high urinary oxalate values, sometimes even in the upper limit of the normal range, are treated to reduce the risk of stone formation.

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Clinical Reference

Female: 3.6-28.8 mg/24 hr
Male: 7.2-44.1 mg/24 hr
Child: 12.6-37.8 mg/24 hr

Turnaround time 30 working days

Ministry of Health code 83945

References:

1. Christopher J. Corder; Banshi M. Rathi; Sairah Sharif; Stephen W. Leslie. 24-Hour Urine Collection, Last Update: August 14, 2023.
2. Von Schnakenburg C, Latta K (2005) Hyperoxaluria. In: Blau N, Duran M, Blaskovics M, Gibson KM (eds) Physician's Guide to the Laboratory Diagnosis of Metabolic Disease, . Springer, Heidelberg, pp 509–518
3. Keevil B.G., Thornton S. Quantification of Urinary Oxalate by Liquid Chromatography–Tandem Mass Spectrometry with Online Weak Anion Exchange Chromatography. Clin. Chem. 2006;52:2296–2299.
4. Koolstra W., Wolthers B.G., Hayer M., Elzinga H. Development of a reference method for determining urinary oxalate by means of isotope dilution—Mass spectrometry (ID-MS) and its usefulness in testing existing assays for urinary oxalate. Clin. Chim. Acta. 1987
5. Marshall D.J., Adaway J.E., Keevil B.G. A combined liquid chromatography tandem mass spectrometry assay for the quantification of urinary oxalate and citrate in patients with nephrolithiasis. *Ann. Clin. Biochem.* 2018;55:461–468