MAYO CLINIC LABORATORIES

Test Definition: KIDST

Kidney Stone Analysis

Overview

Useful For

Managing patients with recurrent renal calculi (kidney stones)

Testing Algorithm

Upon arrival in the performing laboratory, all stone specimens and the containers in which they are received will be inspected. Prior to analysis, stones must be clean and dry.

Special Instructions

- Patient Collection Instructions for Kidney Stones
- Kidney Stone Packaging Instructions

Method Name

Infrared Spectrum Analysis

NY State Available

Yes

Specimen

Specimen Type

Stone

Necessary Information

Specimen source is required.

Specimen Required

Supplies: Stone Analysis Collection Kit (T550)
Sources: Bladder, kidney, prostatic, renal, or urinary
Specimen Volume: Entire dried calculi specimen
Collection Instructions:
1. Have patient collect specimen using the Patient Collection Instructions for Kidney Stones.
2. For detailed instructions on kidney stone preparation and packaging, see Kidney Stone Packaging Instructions.
3. Prepare stone by cleaning any blood or foreign material from the stone with deionized water.
4. Place stone on a clean filter or paper towel and let dry at ambient temperature for a minimum of 24 hours.
5. **Do not place stone directly in a bag.** If specimen is received in a bag, either transfer stone into a screw-capped, plastic container or place bag containing stone in a screw-capped, plastic container.
6. Indicate source of specimen on the outside of the container (eg, left kidney, bladder, right ureter).
7. Repeat steps 2 through 5 for each stone received.
Specimen Stability Information: Ambient (preferred) 2 years/Refrigerated 1 year/Frozen 1 year

Forms

If not ordering electronically, complete, print, and send 1 of the following forms with the specimen:
-Renal Diagnostics Test Request (T830)
-General Test Request (T239)

Specimen Minimum Volume

Entire stone

Reject Due To

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

Specimen Stability Information

Specimen Type	Temperature	Time	Special Container
Stone	Ambient (preferred)		
	Refrigerated	365 days	
	Frozen	365 days	

Clinical & Interpretive

Clinical Information

The composition of urinary stones may vary from a simple crystal to a complex mixture containing several different species of crystals. The composition of the nidus (center) may be entirely different from that of the peripheral layers.

Eighty percent of patients with kidney stones have a history of recurrent stone formation. Knowledge of stone composition can be useful to guide therapy of patients with recurrent stone formation.

Treatment of urinary calculi can be complex.(1) In an overly simplified format, the following patterns are often treated as follows:
-Hyperuricuria and predominately uric acid stones: Alkalinize urine to increase uric acid solubility
-Hypercalciuria and predominately hydroxyapatite stones: Acidify urine to increase calcium solubility
However, treatment also depends on urine pH and urine phosphate, sulfate, oxalate, and citrate concentrations.
-Hyperoxaluria and calcium oxalate stones: Increase daily fluid intake and consider reduction of daily calcium
However, daily requirements for calcium to maintain good bone formation complicate the treatment.
-Magnesium ammonium phosphate stones (struvite): Investigate and treat urinary tract infection.

Reference Values

The presence of a kidney stone is abnormal. A quantitative report will be provided after analysis.

Interpretation

The interpretation of stone analysis results is complex and beyond the scope of this text. For more information see the second Clinical Reference.

Calcium oxalate stones:
-Production of calcium oxalate stones consisting of oxalate dihydrate indicates that the stone is newly formed, and current urine constituents can be used to assess the importance of supersaturation.
-Production of calcium oxalate stones consisting of oxalate monohydrate indicates an old (>2 months since formed) stone, and current urine composition may not be meaningful.

Magnesium ammonium phosphate stones (struvite):
-Production of magnesium ammonium phosphate stones (struvite) indicates that the cause of stone formation was infection.
-Treatment of the infection is the only way to inhibit further stone formation.

Ephedrine/guaifenesin stones:
-Certain herbal and over-the-counter preparations (eg, Mah Jung) contain high levels of ephedrine and guaifenesin. Excessive consumption of these products can lead to the formation of ephedrine/guaifenesin stones.

Cautions
No significant cautionary statements

Clinical Reference
1. Mandel NS, Mandel IC, Kolbach-Mandel AM. Accurate stone analysis: the impact on disease diagnosis and treatment. Urolithiasis. 2017;45(1):3-9. doi:10.1007/s00240-016-0943-0
2. Smith LH: In: Schrier RW, Gottscholk CW, eds. Diseases of the Kidney. 4th ed. Little, Brown and Company; 1987:chap 25
3. Lieske JC, Segura JW. Evaluation and medical management of kidney stones. In: Potts JM, ed: Essential Urology: A Guide to Clinical Practice. Humana Press; 2004:117-152
4. Lieske JC. Pathophysiology and evaluation of obstructive uropathy. In: Smith AD, Gopal Badlani B, Bagley D, et al. Smith's Textbook of Endourology. 2nd ed. BC Decker Inc; 2007:101-106

Performance

Method Description
Representative specimens are taken from all identifiable layers of the calculus (stone). Each specimen is crushed into a fine powder. An infrared spectrum of each specimen is recorded, and the resulting spectrum compared against reference spectra of all known calculus components. This procedure allows for accurate analyses of complex crystal mixtures as well as the hydration state of each crystal type.(Hesse A, Bach D. Stone analysis by infrared spectroscopy. In: Rose GA, ed: Urinary Stones: Critical and Laboratory Aspects. University Park Press; 1982; Gambaro G. Croppi E, Coe F, Consensus Conference Group, et al. Metabolic diagnosis and medical prevention of calcium nephrolithiasis and its systemic manifestations: a consensus statement. J Nephrol. 2016;29(6):715-734)

PDF Report
No

Day(s) Performed
Monday through Saturday

Report Available
4 to 6 days

Specimen Retention Time
7 days

Performing Laboratory Location
Mayo Clinic Laboratories - Rochester Superior Drive

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 was developed and its performance characteristics determined by Mayo Clinic in a manner consistent with CLIA requirements. It has not been cleared or approved by the US Food and Drug Administration.

CPT Code Information
82365

LOINC® Information

Test ID	Test Order Name	Order LOINC® Value
KIDST	Kidney Stone Analysis	74446-6

Result ID	Test Result Name	Result LOINC® Value
SRC1	Source:	31208-2
605761	Kidney Stone Analysis	40787-4
605762	Stone Interpretation	56119-1
618163	Result Comment	77202-0