Accurate Kidney Stone Analysis

Presenter:
Paul J. Jannetto, PhD
Associate Professor of Laboratory Medicine and Pathology
Director, Clinical and Forensic Toxicology, Clinical Mass Spectrometry Lab and Metals Lab

Department of Laboratory Medicine and Pathology
at Mayo Clinic, Rochester, Minnesota
Disclosures

• None

Kidney Stones

• Common worldwide (Prevalence 7-10% USA)
• Increasing in frequency
• Irretrievable specimen
• Painful
• Accurate analysis of kidney stones is important for the management of patients
Clinical Importance of Kidney Stone Analysis

• “After stone passage/removal, accurate stone analysis of urinary stone composition is the most crucial laboratory diagnostic procedure for the treatment and recurrence prevention in the stone-forming patient”

Kidney Stone Analysis (KIDST)

1. Proper collection, handling, and labeling of kidney stones.
   i. Stone analysis collection kit available (T550)
   ii. Clean any blood or foreign material from the stone with water
   iii. Dry stone at room temperature (~24 hrs) on a tissue/towel and send entire stone in screw-capped plastic container.
   iv. Indicate source of stone (e.g. urine, kidney, ureter, bladder, etc.)
The Kidney Stone Must Be Clean and Dry for Accurate Analysis

Kidney Stone Analysis (KIDST)

• Stone analysis should be done with modern methods, either infrared spectroscopy or X-ray diffraction.
• Fourier transform infrared (FTIR) spectroscopy is considered the reference method.

FT

- Every sample has a unique IR spectrum; an IR spectrum can serve as a compound's fingerprint.

Example of Calcium Oxalate Monohydrate
Importance of a “Dry Stone”

Common Types of Kidney Stones

% Composition

- Calcium oxalate
- Hydroxyapatite
- Uric acid (any)
- Struvite (any)
- Brushite (any)
What should your lab do if you received a wet or dirty stone from the patient?