Urinalysis and Body Fluids

Unit 2; Session 5

Crystals Found in the Urine
Microscopic Examination - Part B, Common Acid Crystals

- Not significant, but have been found in calculi
- Not present in fresh warm urine
  - Performing all urine tests asap will improve quality of results.
- Broadly categorized by pH
  - Sometimes may not obey the rules

Microscopic Sediment - Urine Crystals

Obj. Explain why performing all aspects of the urinalysis as soon as possible will provide the most accurate assessment of macroscopic and microscopic characteristics.
Obj. Identify or describe the normal and abnormal constituents that may be seen in the urine microscopic including... cells... acid, alkaline and pathologically significant crystals...

- Uric acid
- Amorphous Urates
- Calcium Oxalates
Normal Crystals in Acid Urine

- **Amorphous urates**
  - Amorphous = no shape
  - Macroscopically
    - Urine sediment has pink color due to the pigment uroerythrin attaching on surface of granules
  - Microscopically
    - Red-Yellow-brown granules
    - May clump or resemble casts
    - Soluble in alkali
    - Dissolve with gentle heat

Uric acid

- Yellow-brown color. Will polarize.
- Pleomorphic
  - Diamond shaped, barrels, rhombic / rhomboid, whetstones, wedges, rosettes, needles, etc
  - Hexagonal shape may resemble the pathological crystal - cystine
- Generally not significant.
  - Pathologic only when seen in freshly voided urine
  - ↑ purines, nucleic acids
  - Often associated with gout.
  - Also may see ↑ in leukemia & in patients on chemotherapy.
Uric Acid Crystals

- Uric acid (what other structures can be seen?)

Calcium Oxalate Crystals

- Acid and neutral pH
- Calcium oxalate is a major component of renal calculi / lithiasis
  - @ 75% composed of CaOx
- Also capable of several shapes
  - Dihydrate (2 water molecules) is envelope or two-pyramid-shaped
    - Most common

Calcium Oxalate (cont.)

Common dihydrate form exhibits distinct bipyramidal shape (two dimensional view appears as a square with an "X" in the center).
**Calcium Oxalate Crystals**

- Monohydrate is oval or dumbbell-shaped
  - Antifreeze poisoning
  - Associated with 1 water molecule - monohydrate
    - Dumbbell
    - Ovoid
    - Long

**Normal Crystals in Acid Urine**

- Hippuric acid
  - Acid and neutral Ph
  - Rarely seen in urine
  - Little to no clinical significance
  - Clear to yellow-brown prisms /plates
  - Can be easily confused with
    - Monohydrate calcium oxalate
    - Small triple phosphate

**Hippuric Acid**

Yellow-brown or colorless elongated prisms or plates. May be so thin as to resemble needles, and they often cluster together.
Normal Crystals in Acid Urine

• Sodium urate crystals
  • rarely encountered
  • Blunt ended needle-like or slender prisms occurring in sheaves or clusters.
  • Colorless or yellowish
  • No significance

Normal Crystals in Acid Urine

• calcium sulfate
  • Rarely seen
  • No significance
  • Identical in appearance to an alkaline crystal - calcium phosphate in its prism form

References

- Susan Strassinger & Marjorie Di Lorenzo, *Urinalysis and Body Fluids*, 5th Ed.
- Mary Haber, M.D., *A Primer of Microscopic Urinalysis*, 2nd Ed.