CLIA
Outpatient Lab Testing
Review Slides
Outpatient Lab Proficiency Testing Review Slides

- KOH Preparation
- Saline Wet Mount
- Pinworm Preparation
- Fern Test
- Urine Sediment Analysis
- Macroscopic Urinalysis
- pH Determination
Trichomonas vaginalis
- most freq parasite in urine
- round pear-shaped or triangular
- motile ant flagellae, undulating membrane

> 10 wbc’s
Sperm
• Oval shaped bodies
• 1/4\textsuperscript{th} size of RBC
• Long thin tail
Clue cell
-squamous epith covered by coccobacilli- *G. vaginalis*
-speckled appearance
-fishy odor with koh
-If B.V. no WBC
Starch granule
- highly refractive
- round, crystal like
Cotton Fibers
• Long, flat, dark
• Typically irregular diameter
• Non segmented
Yeast (Candida vulvovaginitis)
Reproduces by budding
Buds may be confused with RBC’s
Buds are oval, colorless, vary in size
Yeast (Candida vulvovaginitis)

Hyphae
- Long
- Branched
- Uniform diameter
Pinworm eggs
- oval, asymmetrical
- one flattened side
- looks like a “D”
Pinworms
Ferning of Amniotic Fluid

Be sure fern test slides labeled:

1. Patient’s name
2. Medical record number
3. Name of test: Fern Test
URINALYSIS: CELLS

- **Nucleated**
  - WBCs- (generally polymorphonuclear)
  - Epithelial- (squamous, transitional, renal)

- **Non-Nucleated**
  - RBCs

- **Bacteria** (very small)
LEUKOCYTES (WBC’S)
- Segmented, multilobed nuclei
- More than 5 per HPF is abn.
- Ameboid action may be observed
EPITHELIAL CELLS
SQUAMOUS-from the lower end of the urinary tract
-largest of all cells in urine with “fried egg” appearance
-reported using LPF (1+ to 4+)
-generally benign, though large number is likely contaminant
SQUAMOUS EPITHELIAL CELL SHOWING DEGENERATIVE CHANGES
-Absence of clear delineation of nucleus or cell margins
-Must view slide w/in 2 minutes to avoid degeneration!
EPITHELIAL CELLS
TRANSITIONAL
-lining renal pelvis, calyces, ureter, bladder, urethra
-spherical, “balloon shaped” (swollen) or polyhedral
-large spherical nucleus
-generally benign unless large numbers
EPITHELIAL CELLS

RENAL
- lining renal tubules
- generally polyhedral (do not swell)
- large spherical nucl. may be placed eccentrically
- generally benign unless large numbers
ERYTHROCYTES (RBC’S)
- relatively constant size
- biconcave disc
- pigmented with hemoglobin
- more than 3 per hpf is abn.
Crenated RBCs
Result of urine with high osmotic gradient
BACTERIA
-most common is E. coli. (GNR)
-sterile urine may be contaminated from bacteria in the air, container, or not using “clean catch” technique
-Refrigerate urine if out for >1hr!
WBC CAST
- nuclei segmented, multi-lobed
- pyelonephritis
- glomerulonephritis
EPITHELIAL CAST
- distinct cell membrane, polyhedral, columnar
- desquamation of renal tubule
  - infections with CMV, hepatitis
  - renal toxins: chemo tx
RBC CAST
-damaged glomerular basement membrane
-pigmented with hgb.
-seen in SLE, GN, pyelonephritis
GRANULAR CAST
-can be seen after severe physical stress
-if abn, usu represents intrinsic renal disease
RBC Cast or Granular Cast?

RBC Cast
BROAD (WAXY) CAST
Renal disease: glomerulonephritis, diabetic nephropathy, nephrosclerosis, malignant HTN, renal amyloidosis
HYALINE CAST
-1 to 2 can be normal especially with physical stress
-high #s may indicate renal disease
URINARY CRYSTALS

- Normal Crystals
  - Urate Crystals and Amorphous Urates (ubiquitous)
  - Ammonium Urate
  - Calcium Oxylate
  - Triple Phosphate

- Abnormal Crystals
  - Cystine
  - Bilirubin
  - (Tyrosine)
  - (Leucine)
URATE CRYSTALS
-most common “ubiquitous”
-variable shapes
-normal, especially if urine low pH and cools to room temp
-also in gout, leukemia
URATE CRYSTALS – Star Shaped
URATE CRYSTALS – Spear-shaped
URATE CRYSTALS – Variegated (Hexagonal)
AMORPHOUS URATE CRYSTALS

- Yellow-brown granules
- Tend to form clumps, but not casts
- No clinical significance
- Dissolve in warm saline, with sodium hydroxide
AMMONIUM URATE CRYSTALS
- Yellow-brown spheres
- Radiating spicules “thorny apple”
- No clinical significance
- Occur in alkaline urine
Ammonium urate crystals
Calcium Oxylate Crystals
-Octahedral, intersecting diagonal lines “X”
-Present with ingestion: Ethylene glycol, mega Vit C, high oxylate foods: Beer, cocoa, berries, tea, rhubarb, spinach, tomato, apple, asparagus, soda
-Can be normal finding in urine
-Also associated with renal stones, DM, liver dz, heart-lung dz
TRIPLE PHOSPHATE CRYSTALS
(Ammonium magnesium phosphate)

• Rectangular, prismatic or “coffin lid” appearance
• Mostly in alkaline urine, usually not clinically signif.
• May indicate urinary obstruction or UTI from urea splitting organisms, such as Klebsiella,
• Pseudomonas, and Proteus (E. coli does not split urea)
CYSTINE CRYSTALS
-hexagonal
-metabolic disorders involving renal transport of amino acids
BILIRUBIN CRYSTALS
- Pigmented yellowish brown
- Granules or clusters of needles
- Hepatobiliary dz
- Hematopoietic dz
End