Equipment

Microscope - for brightfield, phase contrast and polarizing microscopy with 10X and 40X objective lenses

Centrifuge - capable of centrifuging urine tubes for 5 minutes at 400 RCF

Quality Control

At least two levels of control material should be analyzed daily.

The following controls should be prepared and used in accordance with the package inserts. Quality Control results should be evaluated and handled with respect to the Clinical Chemistry Quality Control Procedure #3000.T. Control results are documented on the UA Confirmatory and Microscopic UA QC Sheet. Reagent lot changes are documented on the back of the UA QC Sheet.

Quality Control Material

Control	Storage
MAS Liquid UA Abnormal Control 1	+2°C to +8°C*
MAS Liquid UA Normal Control 3	+2°C to +8°C*

*Urine controls are received and stored at 2°C to 8°C. Bottles of controls in use are stored at +2°C to +8°C and are good for 30 days

The controls are treated in the same manner as patients (see procedure below). The normal and abnormal samples are centrifuged, decanted and plated. Perform microscopic analysis and document on manual QC sheet. Compare to acceptable ranges. Repeat if out of control. Simulated RBCs and WBCs may be used in the control products.

Procedure

Urinalysis Procedure

Only color, clarity, and chemical analysis are routinely performed. A microscopic analysis is only performed when the sieve criteria are met. These include:

Color - other than Yellow or none
Clarity - other than clear
Leukocyte Esterase ≥ trace
Nitrite - positive
Blood ≥ trace
Protein ≥ trace

Using these conservative criteria, our study, conducted in 1995 with 689 study specimens, showed that less than one percent of clinically significant microscopic elements would be missed, and up to forty percent of microscopic examinations could be eliminated. The microscopic examination is ordered reflexively by the LIS as indicated by the sieve criteria.

Manual Method

Urine chemistries and specific gravity are performed on uncentrifuged urine.

Eight (8) mL is required for an accurate manual microscopic examination. Only note volumes less than eight (8) mL if you review the urine with the microscope. The comment “Reference intervals not established on urine < 8 mL in volume” will be appended to the volume. The mnemonic “**LT8**” may also be used.

If manual microscopic evaluation is required, urine specimens with volumes > 1 mL are centrifuged, and the microscopic examination is performed on the sediment.

If < 1mL urine is submitted, do not centrifuge. Perform microscopic on unspun urine. The comment "Volume ≤ 1 mL. Microscopic performed on unspun urine" will be appended if the volume entered is less than 1 mL. The mnemonic "**UNSPUN**" may also be used.

Specimens exhibiting gross hematuria cannot be tested undiluted on the iQ Series. Gross hematuria may cause incorrect results in subsequent samples due to carryover.

Samples requiring microscopic analysis will be performed manually if the sample:
is less than 1 mL,
is mucoid,
contains gross/visible particulate matter, or
demonstrates IRIS Flow or other sampling errors.

1. Centrifuge urine samples for five (5) minutes at 400 RCF.
2. After centrifugation, insert a Kova® Petter into the urine tube, and carefully push it to the bottom of the tube.
3. Pour off the supernatant, leaving approximately 1 mL of concentrated urine sediment. Resuspend the sediment by gently squeezing the Kova® Petter until the sediment is well-mixed.

Microscopic Examination

At the beginning of each shift, be sure the microscope has been adjusted correctly with Kohler Illumination, and the vortex mixer is set to a low mixing speed. (Attachment A)

1. Withdraw a small well-mixed sample via Kova® Petter or transfer pipette.
2. Transfer specimen to a KOVA® Slide II by placing pipette on the open recessed area adjacent to the covered chamber. Allow to fill by capillary action.
3. Allow to stand for at least one minute before performing microscopic examination.
4. Examine the sediment using Phase 1, or low power (10X) and low light, for casts and mucus. Using the phase contrast will help to visualize these elements more easily. Scan 10-15 fields and count the number and types of casts seen per low power field and record the average number casts/LPF. Cells within the cast matrix should be identified, if possible. Also from scanning, determine the amount of mucus if present.
5. Examine the sediment using high power (40X) and Phase 2, or moderate light, for WBC's, RBC's, epithelial cells (squamous, transitional, renal) and bacteria. using the phase contrast will help visualize internal structure of cells more easily. Scan 10-15 fields and count the number of each cell type seen per field and record the average number of cells/HPF. If WBC clumps and/or dysmorphic RBCs are seen, report as present.
6. While still under high power, scan 10-15 fields and look for the presence of and identify crystals, sperm, yeast, *Trichomonas sp.*, amorphous sediment and any other elements.
7. Be sure to correlate macroscopic findings with microscopic and chemical findings. See *Urinalysis Correlation* chart. (Attachment B)
8. If you are unable to identify a microscopic finding, request assistance from another technologist, a supervisor, or a specialist.
9. Write your findings on the manual results slip. See *Manual Microscopic Result Form.* (Attachment C) Make sure the patient label on the slip matches the label on the urine sample tube.