

Urinalysis and Body Fluids CP9

Unit 2; Session 3

WBCs in the Urine Microscopic

Microscopic Sediment - White Blood Cells

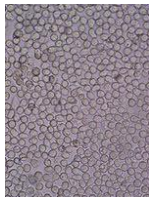
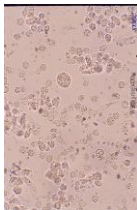
- White Blood Cells
 - WBCs can enter anywhere in the urinary system (diapedesis).
 - Men 0-2 /hpf ; Women < 5 /hpf
 - Increased numbers. (pyuria / leukocyturia)
 - Without bacteria
 - Inflammation - trauma / certain disease states / appendicitis / pancreatitis / malignancy /allergic reaction / dehydration / stress/ fever/non-infectious irritation to urinary structures
 - With increased bacteria
 - Likely infection -/ UTI

@ 7 WBC identifiable, ones at arrows are best examples. Others possible, but need to change focus for better evaluation. 3-5 RBCs.



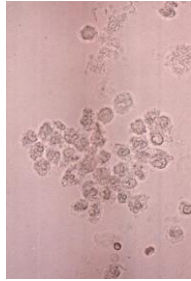
Microscopic Sediment - White Blood Cells

- White Blood Cells
 - Increased numbers. (pyuria / leukocyturia)
 - Quantitating WBC in urine
 - Ave. number seen in 10-15 hpf
 - This example 11-20 WBC/hpf



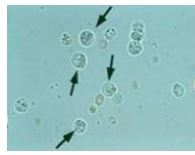
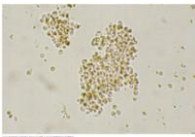
Microscopic Sediment - White Blood Cells

- **Detection**
 - High dry objective (10x ocular + 40x objective = 400x total mag.)
 - Fine adjustment
- **Description**
 - Grayish-blue / yellowish-green in color - depending on microscope
 - @ 10-12 microns in diameter, but affected by specific gravity of urine
 - Fine cytoplasmic granulation, rough surface, may have irregular edges.
 - Usually polynuclear, but may be mononuclear, but often hard to see detail.



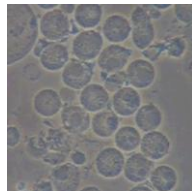
Microscopic Sediment - White Blood Cells

- WBCs - larger than RBCs
- WBCs - smaller than renal epithelial cells.
- WBCs - usually neutrophils
- WBCs - may be in clumps



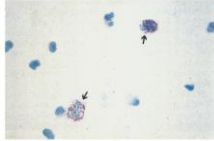
Microscopic Sediment - White Blood Cells

- **Neutrophil is predominant**
 - Identify under high power
 - Glitter cells
 - Hypotonic urine
 - Brownian movement
 - Swell; granules sparkle
 - Pale blue if stained
 - Nonpathologic



Microscopic Sediment - White Blood Cells

- Eosinophils
 - Hansel stain preferred over Wrights to demonstrate presence of eosinophils in urine.
 - Increases seen in variety of conditions,
 - Drug-induced interstitial nephritis
 - Renal transplant rejection / acute graft rejection
 - most allergic reactions schistosomiasis, & acute allergic interstitial nephritis



Microscopic Sediment - White Blood Cells

- Mononuclear cells - more rarely encountered than segmented neutrophils
 - Lymphocytes
 - Monocytes
 - Macrophages
 - Histiocytes
- Differentiate from renal tubular epithelial (RTE) cells
 - Lymphocytes may resemble RBCs; seen in early transplant rejection
 - May need to refer to cytodagnostic testing

Microscopic Sediment - White Blood Cells

- Lymphocytes
 - Occasionally seen in normal sediment
 - Increased numbers reported in acute allergic interstitial nephritis, graft rejection, etc.
 - Requires special staining (PAP) to verify identity

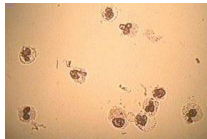
Microscopic Sediment - White Blood Cells

- **Monocytes**
 - Also can be found in conditions listed for lymphocytes
 - Also requires special staining to verify identity
- **Macrophages**
 - Usually of normal size with inclusions in cytoplasm.
 - Occasionally enlarged with one or more smaller cells engulfed.
 - Seen in acute inflammatory processes
 - ***When filled with fat droplets would be called oval fat bodies.



Microscopic Sediment - White Blood Cells

- **Review of identification**
 - Grayish-blue sheen, @ 10-12 microns in diameter
 - Polynuclear neutrophils most seen
 - Fine cytoplasmic granulation, rough surface, may have irregular edges.
 - Few lymphs seen as well, but hard to ID
 - Enhancement techniques
 - Stains
 - Sternheimer- Malbin for general
 - Hansel for eosinophils
 - Toluidine blue
 - PAP
 - Microscopy
 - Light microscope
 - Phase contrast



Microscopic Sediment - White Blood Cells

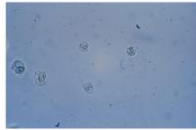
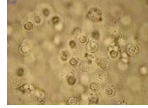
⌘ Phase contrast



Microscopic Sediment - White Blood Cells

- WBC / leukocytes

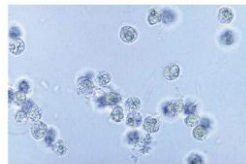
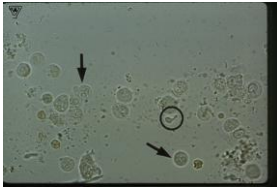
This slide has higher level of magnification than normally used in routine examination.



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Microscopic Sediment - White Blood Cells

WBCs, RBCs, cell debris, bacteria



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References

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