



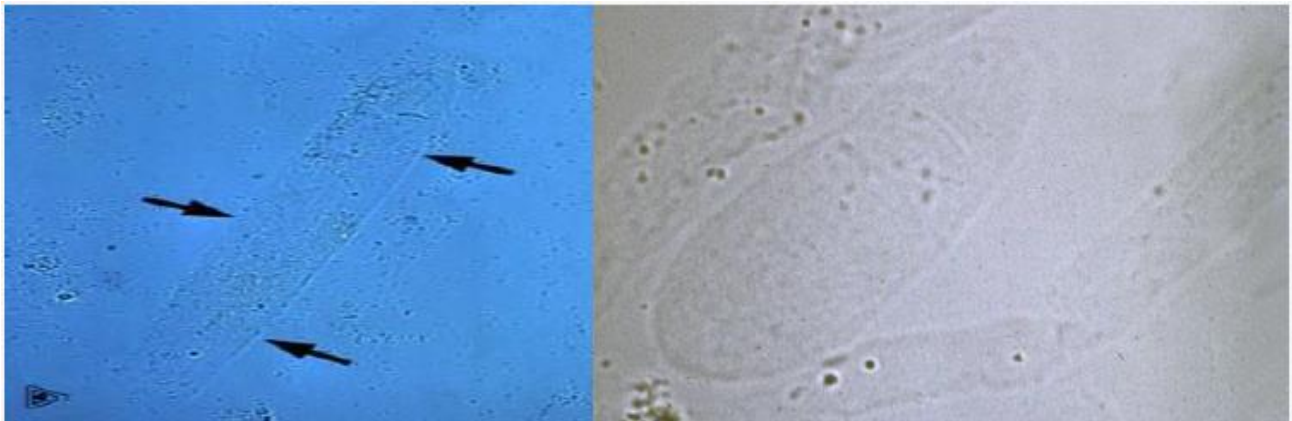
General Urine Examination

6-casts: -

Appearance:

The most common type of cast, hyaline casts are solidified Tamm-Horsfall mucoprotein secreted from the tubular epithelial cells of individual nephrons.

1-Hyaline casts: - are cylindrical and clear, with a low refractive index, so that they can easily be missed under bright field microscopy or on an aged sample where dissolution has occurred.



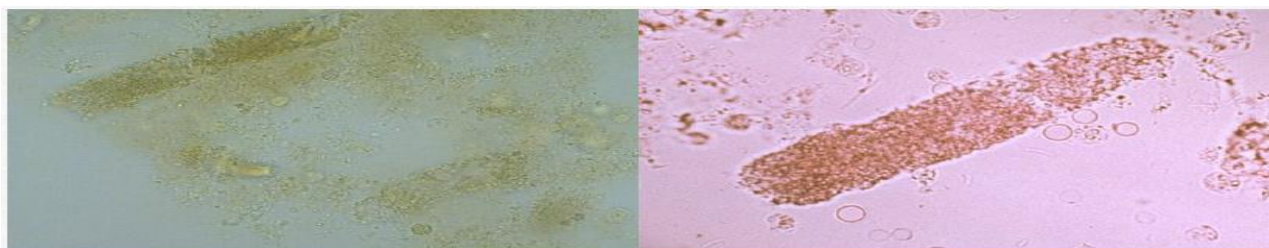
2-Granular casts: -

Appearance:

It can result either from the breakdown of cellular casts (remain in the nephron for some time before they are flushed into the urine), or the inclusion of aggregates of plasma proteins (eg, albumin) or immunoglobulin light chains.

Depending on the size of inclusions, they can be classified as fine or coarse, though the distinction has no diagnostic significance.

Appearance is generally more cigar-shaped and of a higher refractive index than hyaline casts.



7-Crystals

Urine contains many dissolved substances (solutes) – waste chemicals that the body needs to eliminate. These solutes can form crystals, solid forms of a particular substance, in the urine if:

The urine pH is increasingly acidic or alkaline. The concentration of dissolved substances is increased; and the urine temperature promotes their formation.

Crystals are identified by their shape, color, and by the urine pH. They may be small, sand-like particles with no specific shape (amorphous) or have specific shapes, such as needle-like. Crystals are considered "normal" if they are from solutes that are typically found in the urine; these usually form as urine cools after collection and were not present in the body. Some examples of crystals that can be found in the urine of healthy individuals include:

- Amorphous urates
- Crystalline uric acid
- Calcium oxalates
- Amorphous phosphates

If the crystals are from substances that are not normally in the urine, they are considered "abnormal." Abnormal crystals may indicate an abnormal metabolic process. Some of these include:

Calcium carbonate

Cystine

Tyrosine

Leucine

Normal or abnormal crystals can form within the kidneys as urine is being made and may group together to form kidney "stones" or calculi. These stones can become lodged in the kidney itself or in the ureters, tubes that pass the urine from kidney to the bladder, causing extreme pain. For more details, read Kidney Stone Analysis and Kidney Stone Risk Panel.

Urine Crystals

Overview:

A variety of crystals may appear in the urine. They can be identified by their specific appearance and solubility characteristics. Crystals in the urine may present no symptoms, or they may be associated with the formation of urinary tract calculi and give rise to clinical manifestations associated with partial or complete obstruction of urine flow.

Q-) Why urine crystals are formed?

When the amount of solutes in urine increase (due to dehydration, dietary intake, or medications) urine super-saturation occurs and crystals will be formed either while the urine is in the body or after the urine is voided

Factors influence the types and numbers of urinary crystals

In vivo factors include:

1-the concentration and solubility of crystallogenic substances contained in the specimen, 2-the urine pH, the excretion of diagnostic and therapeutic agents.

In vitro factors include:

temperature (solubility decreases with temperature), evaporation (increases solute concentration), and Urine pH (changes with standing and bacterial overgrowth).

Procedure:

Collect a random urine specimen.

Note: *Crystal identification should be done on freshly voided specimens.*

Examine the urinary sediment microscopically under high power.

The pH of the urine is an important aid to identification of crystals and must be noted.

Interfering Factors

Refrigerated urine will precipitate out many crystals because the solubility properties of the compound are altered.

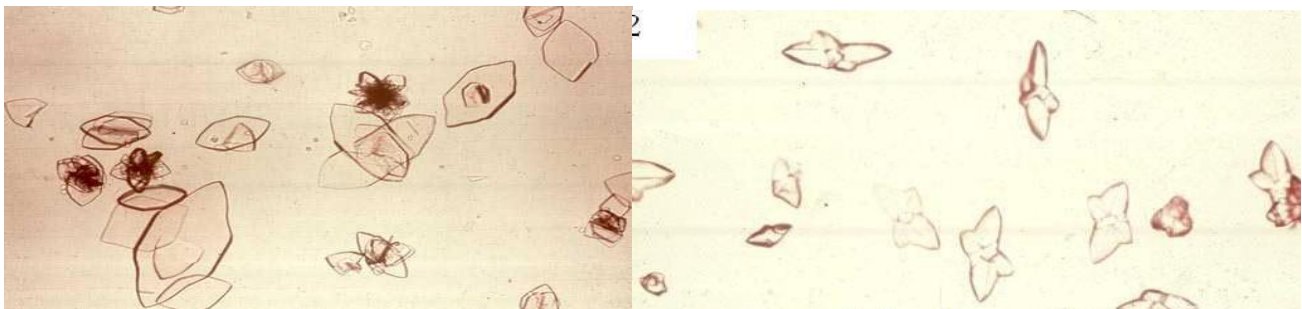
Urine left standing at room temperature will also cause precipitation of crystals or the dissolving of the crystals.

Appearance:

Uric Acid crystals

Pure uric acid crystals are colorless but the sediment in urine is impure so these crystals usually appear pigmented. Uric acid crystals may appear as yellow to brown rhombic or hexagonal plates, needles or rosettes.

It may be found in gout, kidney stones, chronic nephritis.

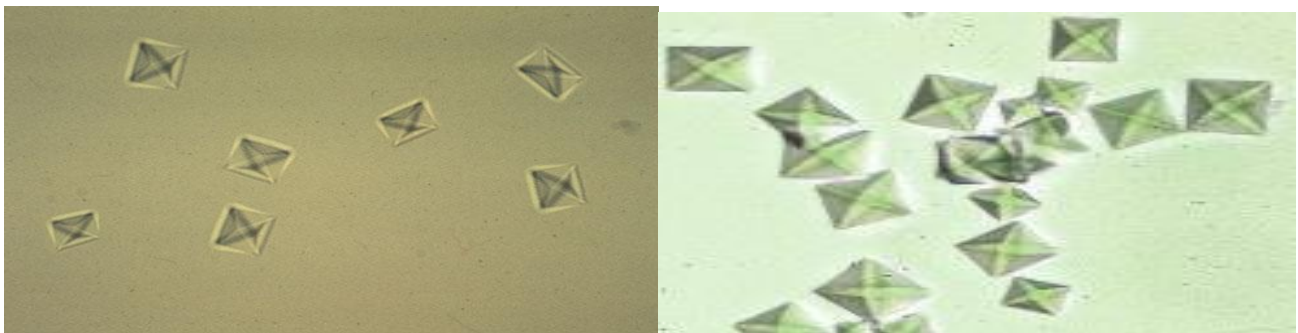


-Calcium Oxalate crystals (Dehydrate)

Calcium oxalate dehydrate crystals typically are seen as colorless squares whose corners are connected by intersecting lines (resembling an envelope).

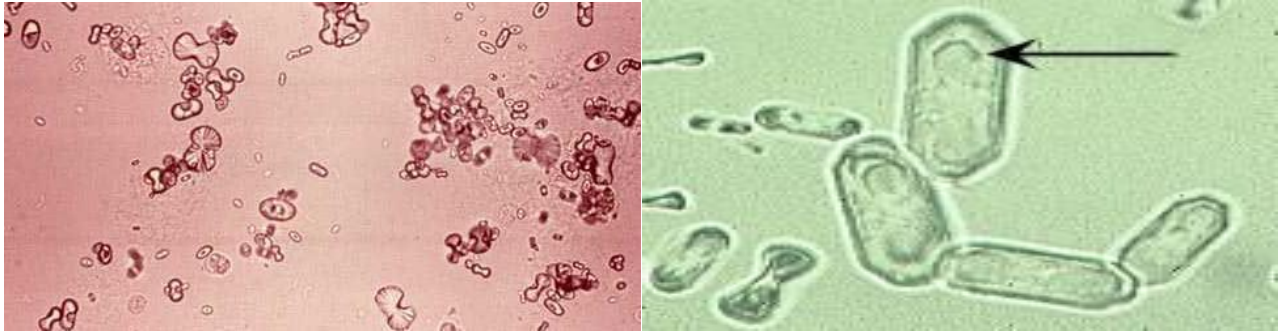
The crystals vary in size from quite large to very small.

Note: In some cases, large numbers of tiny oxalates may appear as amorphous unless examined at high magnification.



-Calcium Oxalate crystals (monohydrate)

Calcium oxalate monohydrate crystals vary in size and may have a spindle, oval. Found normally in urine after ingestion of vitamin C, tomato, spinach, garlic and orange.



-Trichomonas vaginalis.

-Habitat.

-If male: urinary bladder, urethra, prostate.

-If female: vagina, and cervix.

-Mode of infection.

☐ Directly through sexual intercourse as parasite can't live outside body for long period.

☐ Indirectly through using patients articles as under wear clothes.

Pathology.

Female symptoms.

Infection is asymptomatic in 15-20% of cases.

Symptoms associated with Trichomonas infection in women include:

☐ dysuria [painful urination].

☐ Painful sexual intercourse.

☐ Burning sensation of the vagina.

Green/Yellow, frothy vaginal discharge with a strong foul-smelling odor.

☐ Trichomonas infection may cause Vaginitis, and Cervicitis.

Male symptoms

Infection is asymptomatic in 50-90% of cases

Symptoms associated with Trichomonas infection in male include:

☐ dysuria.

☐ Mild urethral discharge.

☐ Slight burning after urination or ejaculation.

☐ Trichomonas infection may cause Urethritis.



Schistosoma haematobium

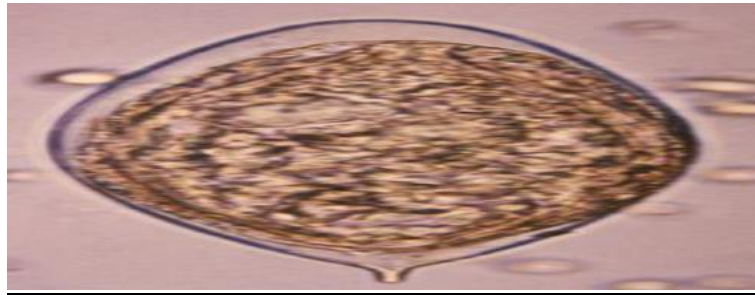
Diagnosis

Clinical diagnosis Clinical signs & symptoms of urinary schistosomiasis include:

- ☐ Haematuria is a common finding.
- ☐ Proteinuria is frequently present.
- ☐ Eosinophils can often be found in the urine.
- ☐ There is usually also a blood eosinophilia.

Urine examination

Examination of urine for detection of egg this help in acute cases when egg can be detected easily in urine.



Urine other findings

Bacteriuria

Overview:

bacteriuria means the presence of bacteria in urine.

Gram-negative bacilli *Escherichia coli* are the most common bacterium isolated from urine samples (>80% of UTIs are caused by *E. coli*).

Smaller percent are caused by Gram-positive cocci (5% to 20%)

Appearance:

Bacteria can be identified in unstained urine sediments when present in sufficient numbers. Rod-shaped bacteria and chains of cocci can be found.



Note: When urine is allowed to remain at room temperature, the number of bacteria doubles every 30 to 45 minutes.

Interpretation:

Bacteria in the urine usually indicate a urinary tract infection (either cystitis or pyelonephritis),

Note: Bacteriuria of clinical significance is usually accompanied by pyuria in ~90% of cases.

Urinary tract infection

A urinary tract infection (UTI) is a bacterial infection that affects any part of the urinary tract.

Any part of this system can become infected. As a rule, the farther up in the urinary tract the infection is located, the more serious it is.

Infection in the upper urinary tract generally affects the kidneys (*pyelonephritis*).

Infection in the lower urinary tract can affect the urethra (*urethritis*) or the bladder (*cystitis*).

causes

Urinary tract infections typically occur when bacteria enter the urinary tract through the urethra (an ascending infection) and begin to multiply in the bladder.

The majority of UTIs are believed to start in the bladder as a result of extreme contamination (commonly by *Escherichia coli*); but in many cases the initiating event is unclear.

In many cases, bacteria first travel to the urethra. When bacteria multiply, an infection can occur. An infection limited to the urethra is called urethritis. If bacteria move to the bladder and multiply, a bladder infection, called cystitis, results. If the infection is not treated promptly, bacteria may then travel further up the ureters to multiply and infect the kidneys. A kidney infection is called pyelonephritis.

Note: *upper urinary tract infections like pyelonephritis may be hematogenous in origin.*

