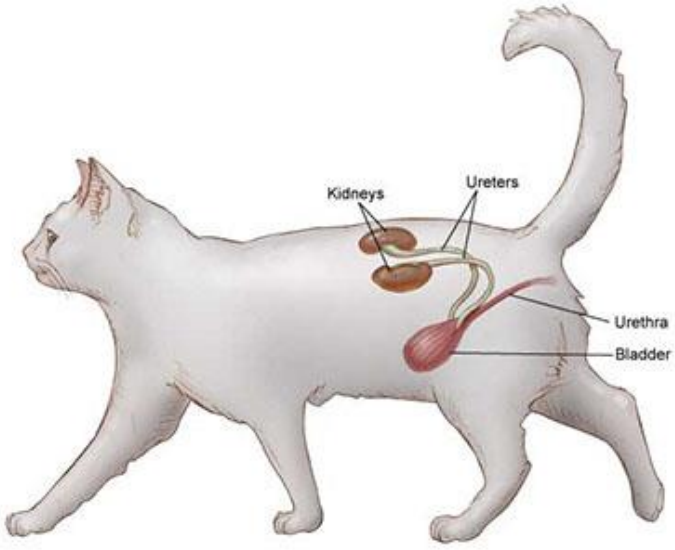
Urinary tract infections

Changes in urination and inappropriate urination (weeing in the house) are relatively common symptoms we are presented with. A first thought with these symptoms is a urinary tract infection (UTI), however bacterial infections are only 1 of a range of disease that can cause this symptom.

With a change in urination a good first step is to test the urine. A urine test involves testing the chemistry, checking the urinary concentration and microscopy, we can also send the urine for a culture to test for bacteria specifically.



Urine chemistry:

With urine chemistry we are looking for abnormal compounds in the urine.

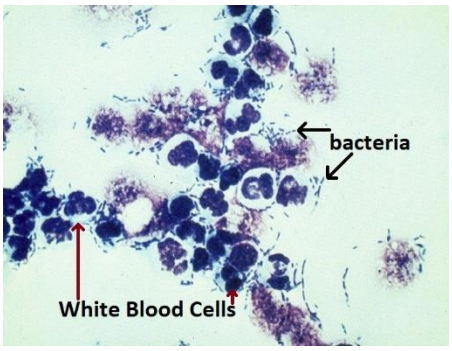
Sugar and ketones: should not be present in urine, if they are diabetes is the most likely cause, there can be other rarer conditions like “fanconi syndrome” too.

Protein: urine can sometimes contain a very small amount of protein, but excess protein can mean inflammation or the kidney’s filter mechanism is not working correctly.

pH: this scale measures how acidic or alkali something is, normal urine is slightly acidic, around pH 6.5 (7 is neutral like water), it can range in cats and dogs but usually sits within the 6-7.5 range. Bacteria tend to increase the pH above 7 (making the urine alkali) as many bacteria produce ammonia compounds.

Bilirubin/urobilirubin: this is a product made in the liver from the breakdown of blood, if there is excess of it then it can show up in the urine, this may indicate liver disease or a disease of the blood itself.

Urine microscopy:



Using a microscope we can look for cells and material in the urine.

Red blood cells: normal urine should not contain blood, if there is blood present this can be due to inflammation, infection or bleeding.

White blood cells: these cells fight off infection, if they are present in the urine it can be due to infection or due to severe inflammation

Bacteria: normal urine is sterile, if there are any bacteria visible in the urine a UTI is present, this can be primary (it's own disease) or secondary (there may be another disease present that makes the bladder more susceptible to infection)

Crystals: there are several different types of crystals that can develop in urine, if left uncontrolled over time these crystals will form stones, the most common 2 we see are struvite crystals and calcium oxylate crystals.

Casts: casts are tubes of cells or cellular debris, they are formed in the kidney and can show up in the urine, they would point to kidney disease being the primary cause.

Other cells: some epithelial cells (cells that line the bladder) are normal, but if they are in excess, or the cells appear bizarre and abnormal, this could be an indication of a mass in the bladder or kidney.

Urine concentration:

A test called urine specific gravity measures how concentrated urine is, urine can be more concentrated then blood (hypertonic) less concentrated then blood (hypotonic) or the same concentration as blood (isotonic).

A normal kidney can produce all three types of urine, but most commonly will produce hypertonic urine first thing in the morning, that is why the first urination of the day can be a very useful test.

A diseased kidney often cannot concentrate or dilute urine so is consistently isotonic.

Urine culture and sensitivity:

If there is evidence of infection, a culture and sensitivity test is a great test to confirm infection (it is more sensitive than the microscope), and can tell us what species of bacteria and which antibiotics it is sensitive to, making treatment more accurate and effective.

Other tests:

Additional tests are sometimes needed on top of the urine tests, these include:

Blood tests: to check for liver or kidney disease, for diabetes and for generalised inflammation.

X-rays: to look for stones in the bladder, kidney, ureters (tube from the kidney to the bladder) or urethra (tube from the bladder to the outside world)

Ultrasound: to look at the structure of the kidneys and bladder, we look for thickening from inflammation, masses like tumours or polyps, structures like cysts and ultrasound can also be used to find stones (not as sensitive as x-rays however).

A diagnosis of an uncomplicated UTI (a bladder infection with no underlying disease) is surprisingly good news, antibiotics penetrate the bladder quickly and response to treatment is usually rapid and curative,

but any UTI should always be checked for other causes, if there is an underlying disease that is not corrected the infection is very likely to return.

Happy Holidays and good health

Dr Tony
Vet HQ