

Health screening in older cats

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BACKGROUND

Thanks to better diets and care in general, more and more of our cats are living to an advanced age. Seeing and examining apparently healthy mature cats is important since it can help to identify clinical problems before they reach a crisis point. Unfortunately, for many illnesses,

clinical signs are subtle, gradual in onset and progression and therefore easy for an owner to miss. Clinical signs can also be confusing – for example, rather than showing lameness, cats with osteoarthritis may show a reluctance to use the catflap. For some of these cats, this may be manifested as an elimination problem, for example



Annual urinalysis (dipstick and specific gravity) is recommended in cats over the age of seven years. Free catch urine samples brought in by the owner are completely acceptable for this purpose.



Cystocentesis is generally the quickest and easiest way to collect a urine sample from a cat. This cat is positioned in lateral recumbency – the thumb is in front of the cranial pole of the bladder while the fingers gently lift the bladder up to the skin.



Urinalysis should include a dipstick (i) and specific gravity (ii). If the specific gravity is less than 1.035 then further investigations should be done to look for possible causes such as hyperthyroidism and chronic kidney disease.

defecating in the house.

I recommend that clinicians follow the iCat Care (formerly Feline Advisory Bureau) WellCat guidelines for assessment of older cats in order to diagnose illness promptly. The WellCat guidelines advocate that:

- Cats of all ages should be assessed at a veterinary practice at least once a year and their weight and body condition score recorded in addition to a general physical examination and discussion of appropriate preventative health care
- In addition to this:
 - 'Mature' cats – those aged ≥ 7 years - should have their blood pressure (BP) checked once a year and a urinalysis performed.
 - 'Senior' cats – those aged ≥ 11 years - should have blood tests done (haematology, serum biochemistry, total T4) once a year. Consideration should be given to increasing the frequency of BP and urinalysis check-ups to every six months in these cats.
 - 'Geriatric' cats – those aged ≥ 15 years - should be assessed at a veterinary practice every six months at which time a clinical examination, weight check, body condition score, BP and urinalysis should be performed. Blood tests should continue to be done annually unless there is any clinical indication to increase the frequency of these.
 - I prefer to see senior patients every six months and geriatric patients every three months.

URINE COLLECTION AND ANALYSIS IN OLDER CATS

A free catch urine sample is adequate for initial urinalysis and can be obtained by the owner with the cat at home. To collect a free catch sample from a cat, the patient is confined with an empty litter tray or one containing non-absorbent cat litter (commercial brands include Katkor®, Mikki®; non commercial options include clean aquarium

gravel, chopped up plastic bags etc). Once the cat has urinated, a urine sample is collected using a pipette or syringe and placed into a sterile tube for subsequent analysis. Free catch sampling can affect interpretation of bacterial culture, sediment examination and proteinuria results.

Cystocentesis urine samples are preferred if urine bacteriology or protein assessment is required. Urine samples can be obtained from conscious cats with minimal restraint. The only requirements for successful sampling are a calm cat whose bladder can be palpated. A detailed guide to this procedure is available on my website: www.catprofessional.com

In-house urinalysis

Gross examination and specific gravity

Urine should be observed and its colour, clarity and presence of gross contamination determined. The specific gravity (USG) should be assessed using a refractometer and not dipsticks. Urine may be defined as isosthenuric (USG = 1.007-1.015, same as glomerular filtrate), hyposthenuric (USG < 1.007) or hypersthenuric (USG > 1.015). Most normal cats will produce very hypersthenuric urine, usually 1.040-1.060. USG can be artificially raised by glucosuria, heavy proteinuria and radiographic contrast media.

A USG below 1.035 is abnormal and should prompt further investigations. A USG greater than 1.040 is normal; a USG between 1.035 and 1.040 is in a grey area and repeat measurement and/or further monitoring is recommended. In cats with USG results below 1.035, further investigations (blood and urinalysis) should focus on excluding common causes such as chronic kidney disease, hyperthyroidism and diabetes mellitus.

DIPSTICK EVALUATION

Urine dipsticks are valuable although they do have limitations. For example, dipsticks are unreliable for



(i) dilation of the pupils (mydriasis) is one potential indication of blindness associated with systemic hypertension

assessment of USG, nitrite, urobilinogen and leucocytes in cats.

- pH: Urine pH should be measured on freshly voided urine. Feline urine is usually acidic (pH 5.5-7.5) depending on the cat's diet. Urine pH may be affected by stress (hyperventilation), acid-base disorders, drugs, renal tubular acidosis and urinary tract infections.
- Protein: Dipsticks are relatively insensitive in documenting proteinuria and do not take into account the concentration of the urine – for example, most cats will produce urine with a trace/+ reading on the dipstick. For a cat with very dilute urine, this could be misleading as a small amount of protein in a very dilute urine sample generally equates to significant amounts of protein loss overall. For this reason, the urine protein to creatinine ratio (UPC) is recommended in all cats with known renal disease or where protein assessment is required. Normal cats have a UPC ratio of less than 0.3-0.4. It is important to remember that proteinuria can be present due to pre-renal disease (eg hyperproteinaemia due to multiple myeloma), renal disease (eg glomerulonephropathy) and post-renal disease (eg cystitis).
- Glucose: A positive reading for glucose on a dipstick indicates glucosuria due to either stress, diabetes mellitus, hyperglycaemia due to receiving glucose-containing intravenous fluids or, rarely, renal tubular disease.
- Ketones: Urinary ketones can be detected on dipsticks in some cats with diabetes mellitus. Occasionally ketones will be seen in non-diabetic cats which are in a catabolic state. Urinary dipstick tests do not detect beta-hydroxybutyrate ketones which tend to rise first in ketotic cats and levels of ketones are reduced by any bacteria present.
- Blood: Dipsticks are sensitive in detecting small amounts of red blood cells, haemoglobin and myoglobin – all of which can produce a red



(ii) when a light is shone into the cat's eyes the pupils remain dilated and the retina can be seen due to retinal detachment. Small areas of retinal haemorrhage are also visible in the left eye.

discolouration of the urine and positive reaction for blood on dipstick. Centrifugation and urine sediment examination is required to distinguish between red blood cells and haemoglobin.

- Bilirubin: In contrast to dogs, bilirubin should not be present in normal cat urine.

SEDIMENT EXAMINATION

After centrifugation of a 5ml urine sample, the sediment can be examined by light microscopy. Normal feline urine should contain:

- Less than 10 red blood cells per high power field (x400)
- Less than five white blood cells per high power field (x400)
- Epithelial cells: the presence, type and quantity are dependent on the method of urine collection

Micro-organisms should normally not be seen in feline urine but may be present due to contamination of free catch or mid-stream samples.

Casts formed from protein and cells in the distal tubule may be identified. These may contain cells, degenerate cells or amorphous material. A few hyaline (protein) casts are a normal finding, but excessive casts indicate renal disease, and material trapped in casts may indicate the aetiology (eg leucocyte casts suggest inflammation/ infection for example due to pyelonephritis)

Crystals are the most difficult component of sediment analysis to interpret. Crystalluria (especially struvite) is common in normal cats. Due mainly to a reduction in temperature (and change in pH), an increase in crystalluria due to additional precipitation will often occur after urine is collected. In assessing the significance of crystalluria, it is important to consider the type of crystal (eg ammonium urate and cystine vs struvite) and quantity. Urate crystals can be seen in cats with hepatopathies (eg portosystemic shunts) and oxalate crystals can be found

in hypercalcaemic cats. Heavy crystalluria is a risk factor for urolithiasis and crystal-matrix urethral plug formation. It is important that crystalluria is not over interpreted. In many cases of idiopathic lower urinary tract disease, crystalluria is a normal (incidental) finding.

BLOOD PRESSURE MEASUREMENT AND INTERPRETATION

Blood pressure should be evaluated as a routine part of check-ups of all cats of seven years of age or older. Unfortunately, hypertension is often only suspected very late in the course of disease – typically once target organ damage (TOD or end-organ damage) has already occurred (Figure 4.). The target organs most vulnerable to hypertensive damage are the brain, heart, kidneys and eyes.

Ideally, diagnostic evaluation should include systolic (SBP) and diastolic (DBP) blood pressure measurement. I recommend Doppler measurement of blood pressure since oscillometric techniques have been shown to be unreliable in conscious cats.

A detailed ophthalmic examination is essential both in the diagnosis and assessment of the extent of ocular disease. A thorough ocular examination is most easily done by using distant indirect ophthalmoscopy. This requires the following:

- A dark room. If a dark room is not available it may be necessary to dilate the pupils using tropicamide.
- Hand held lens – eg 2.2 Dioptre, Pan Retinal lens – held at arms distance, just in front of the eye.
- A light source held by the side of your head: best is a focussed light source (eg Finhoff transilluminator attached to your otoscope/ophthalmoscope body) but good working alternatives would be your standard ophthalmoscope set to a small circle or, failing that, a pen torch. Shine the light into the cat's eye; once a tapetal reflection can be seen, insert the lens just in front of the eye and an upside down image of the fundus will be seen.

Direct ophthalmoscopy can be used to have a closer look at any lesions identified. A free guide to ocular manifestations of systemic hypertension is available on my website www.catprofessional.com

Blood pressure measurement should be performed in a quiet room, away from barking dogs and telephones, ideally allowing the cat 10 minutes to acclimatise to these surroundings before the measurements are taken. This 'acclimatisation' period helps to reduce the incidence of 'white coat hypertension'.

INTERPRETATION OF SBP RESULTS

A number of different 'reference ranges' have been published for normal cats citing normal SBP readings from 107 to 181 mmHg in healthy cats. When it is possible to

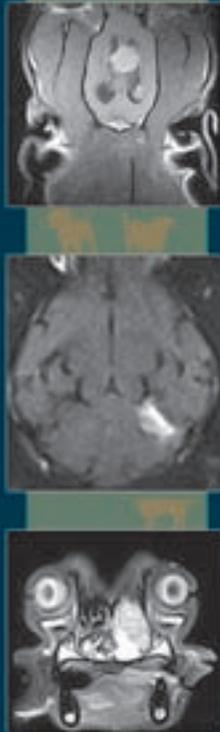
measure it, the DBP of normal cats should be <95 mmHg. 'White coat' hypertension or stress-induced increases in the SBP are a significant issue when interpreting blood pressure results in cats. On average, the 'white coat' effect increases SBP by 15-20 mmHg. However, the effect is highly variable between cats and can be as much as 75 mmHg.

SBP > 180 mmHg: severe risk of TOD

In general, cats with SBP in excess of 180mmHg are genuinely hypertensive and therapy is justified. However, some healthy cats may transiently have SBP above 180 mmHg. Hypertension should therefore never be treated solely on the basis of a single abnormal blood pressure reading. If evidence of TOD is present, the diagnosis of hypertension is confirmed and treatment can be instituted. In the absence of TOD it is prudent to re-check the SBP on another occasion before pursuing treatment. The author recommends the following steps are taken in cats with SBP readings >180mmHg:

- Ensure that measurements are taken correctly allowing at least five to 10 minutes for acclimatisation before readings are taken
- Perform a clinical and ocular examination: if evidence

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of TOD, the diagnosis of systemic hypertension is confirmed

- If no evidence of TOD: repeat measurements on one or two separate occasions within one to two weeks. If readings remain high, anti-hypertensive treatment is justified. Further investigations aimed at finding secondary causes of hypertension should be pursued.

SBP 160-180mmHg: moderate risk of TOD

SBP readings that are persistently between 160-180mmHg are believed to pose a moderate risk of TOD. Persistence is defined as being present on several occasions over a two-month period. If there is evidence of TOD or if the cat is known to have CKD or any other condition known to be associated with hypertension, then anti-hypertensive therapy is justified. In the absence of either of these, it might not be possible to rule out 'white coat' hypertension and further monitoring might therefore be more appropriate.

SBP 150-159mmHg: mild risk of TOD

Cats in this group may have mild hypertension but many normal cats will also give blood pressure readings in this range due to the 'white coat' effect. Treatment is not normally recommended unless there is evidence of TOD. For those cats with conditions known to predispose to hypertension, one to three monthly monitoring of blood pressure and evaluation for evidence of TOD is

recommended once readings >150mmHg are obtained.

SBP less than 150mmHg

Most normal cats have SBP readings of 120-150mmHg. This should be viewed as the ideal 'target range' following treatment for hypertension.

FURTHER INVESTIGATIONS

Blood tests should be done after an eight-hour fast (water intake should not be limited during this period). Mature and geriatric blood profiles ideally should include a complete haematology and serum biochemistry with particular attention to proteins, liver enzymes, electrolytes, urea, creatinine and thyroxine.

CONCLUSIONS

The potential benefits of maintaining contact with the mature healthy feline patient are easy to see. By identifying clinical problems such as osteoarthritis we can offer targeted therapy which can benefit the cats quality of life immediately. Diagnosis of some conditions such as systemic hypertension before it has resulted in clinical signs can prevent severe consequences such as blindness. Maintaining contact with healthy mature cats is definitely a challenge but hopefully one which is eminently rewarding to the cat, its owner and us.

Reader Questions and Answers

1. WHICH OF THE FOLLOWING EVALUATIONS IS THE MOST ACCURATE AND PRACTICAL METHOD FOR ASSESSING PROTEINURIA IN CATS?

- Urinalysis
- Dipstick evaluation
- Quantitative protein assessment
- 24 hour protein excretion
- Urine protein: creatinine ratio (UPC)

2. 'WELLCAT... FOR LIFE' RECOMMENDS AN ANNUAL HEALTH CHECK-UP, BP AND URINALYSIS FOR:

- Only those cats aged one year and over
- Only those cats aged three years and over
- Only those cats aged seven years and over
- Only those cats aged 11 years and over
- Only those cats aged 15 years and over

3. WITH APPARENTLY HEALTHY CATS WHO HAVE USG OF 1.035 – 1.040...

- No further action is required, their USG is normal
- Repeat assessment is recommended in less than six months as this is considered a 'borderline' result.
- Further investigation is recommended, their USG is abnormal

4. WHICH EQUIPMENT IS MOST SUITABLE FOR MEASUREMENT OF SYSTOLIC BLOOD PRESSURE IN CONSCIOUS CATS?

- Direct blood pressure measurement
- Indirect measurement using a Doppler blood pressure unit (eg CAT Doppler, Vettex, Parks)
- Indirect measurement using an oscillometric machine (eg Memoprint, Dynamap)

5. FREE CATCH URINE SAMPLES CAN AFFECT INTERPRETATION OF SOME URINE TESTS. WHICH OF THE FOLLOWING TESTS IS NOT AFFECTED BY THE METHOD OF URINE SAMPLE COLLECTION?

- Bacterial culture
- Protein assessment
- Sediment examination
- Urine specific gravity

ANSWERS: 1, E; 2, C; 3, B; 4, B; 5, D.