WHAT IS YOUR DIAGNOSIS?

A ten-year-old, female neutered domestic short haired was presented to the R(D)SVS Internal Medicine service for investigation of a chronic three month history of progressive weight loss and recent acute onset of lethargy and hyporexia. Physical examination revealed a body condition score of 3/9, unkempt coat and normal vital signs. The cat appeared visual but had bilateral mydriasis in a well-lit environment and displayed bilaterally reduced pupillary light reflexes (PLRs), both direct and consensual. Direct ophthalmoscopy revealed the above lesions (please see figures A and B). The rest of the neurological and ophthalmological examinations was normal.

1) **What are the lesions found in the retinal exam?**
   What is your differential diagnosis?

2) **How would you evaluate this case further?**

3) **How would you treat and monitor this cat?**
1. **What are the lesions found in the retinal exam?**

Both eyes revealed severe changes consistent with retinal detachment and retinal haemorrhage in the tapetal fundus. Retinal detachment can be small or focal occasionally, appearing like a small bleb or blurred area. It can also affect larger areas of the retina such as in this case; which will only be attached at the *ora ciliae retinæ* (retinal periphery) and at the optic disc. Ophthalmoscopy revealed an anterior displacement of the retinal surface and retinal blood vessels. Subretinal fluid can form causing some portions of the retina to balloon anteriorly. If there is a total detachment, the retina will hang in folds only attached from the optic disc, resembling a grayish-coloured curtain. The tapetum over the detachment will appear hyperreflective, due to neuronal atrophy as the light is not absorbed by the retina.

A focal retinal detachment affecting a minor retinal area will not usually result in vision impairment detectable during a physical examination, whereas detachment of the entire retina causes blindness. Extensive detachments and retinal haemorrhages may cause secondary eye lesions such as uveitis or even cataracts in severely affected cases. Hyphaema (blood in the anterior chamber) or secondary glaucoma can be found as well. Some vision might be retained during the acute phase of detachments, shown by residual PLRs present at these times, such as in this case.

**What is your differential diagnosis?**

- Hypertension (hypertensive retinopathy). In cats, it tends to be secondary to one or several of the following conditions:
  - Kidney disease (acute or chronic)
  - Hyperthyroidism
  - Diabetes mellitus
  - Chronic anaemia
  - Pheochromocytoma
  - Hyperaldosteronism
  - Drug induced (i.e. corticosteroids)
- Hyperviscosity syndrome
- Polycythaemia
- Infectious: toxoplasmosis, feline infectious peritonitis, fungal (cryptococciosis, blastomycosis, histoplasmosis; uncommon in the UK)
- Neoplastic: Intraocular tumour, lymphoma
- Traumatic event

2. **How would you evaluate this case further?**

A blood pressure measurement (Doppler method) revealed systemic hypertension at 200 mmHg (mean systolic measurement). Haematology and blood smear evaluation showed a mild non-regenerative anaemia. Serum biochemistry including revealed renal azotaemia (creatinine 200 umol/l, reference 22 – 162 umol/l). Phosphorus, electrolytes and total T4 (thyroid hormone) were normal. The urine specific gravity was 1.012 (isosthenuric) and the urine protein:creatinine ratio was 0.3. Urine sediment examination was unremarkable and bacterial culture was negative. An abdominal ultrasound revealed bilaterally small kidneys with an irregular contour and lack of cortico-medullary differentiation. This classified this cat as an IRIS CKD stage 2, borderline proteinuric, severely hypertensive.
3. **How would you treat and monitor this cat?**

In this case, the severe hypertension was managed promptly with oral amlodipine. A starting dose of 0.625 mg orally was given. The systolic blood pressure normalised 4 hours after the medication was given, but appeared high again 12 hours afterwards. The amlodipine was then given at a dose of 0.625 mg orally every 12 hours since, which achieved sustained normotension (130 mmHg systolic). The cat was progressively switched to a renal prescription diet as well.

**Discussion**

Feline hypertension is a common condition in older cats that is frequently diagnosed in association with other diseases such as chronic kidney disease and hyperthyroidism (so-called secondary hypertension); although some cases of apparent primary hypertension are also reported. The clinical consequences of hypertension can be severe, related to target organ damage (TOD). The organs typically affected by these are the eye, heart and vasculature, brain and kidneys. Clinical manifestations of TOD can be striking and may be the reason for presentation to the veterinarian (i.e. acute blindness or seizures). However, TOD is not always present and in some cats, clinical signs of their underlying disease may predominate or there may be no overt clinical signs. Systolic blood pressure measurement should be included in the recommended investigations of geriatric cats as part of regular health checks, as early diagnosis (and management) of hypertension is considered valuable to prevent TOD. Furthermore, regular blood pressure measurements are recommended in cats already diagnosed with CKD as their disease can progress and cause hypertension after the diagnosis. Please see recommended bibliography below for recommendations on blood pressure measurement and interpretation in feline patients.

If evidence of target organ damage exists, cats should be treated without the need to demonstrate persistently increased systolic blood pressure. Cases like this are considered hypertensive emergencies requiring immediate reduction in blood pressure. According to the IRIS (International Renal Interest Society) recommendations, a systolic blood pressure of ≥ 180 mmHg is classified as severe hypertension leading to high risk of target organ damage. The goal of therapy then should be achieving a normal systolic blood pressure (≤ 150 mmHg). Amlodipine is the drug of choice in CKD cats with hypertension. This drug is a calcium channel blocker that causes arterial dilation, acting on the vascular smooth muscle, decreasing the vascular tone and the blood pressure. Although hypotension is a rare complication, monitoring of blood pressure is always recommended in these cases. Drugs in the group of ACEi (angiotensin-converting-enzyme inhibitors) such as benazepril or enalapril can achieve a small reduction in systolic blood pressure (theoretically around 10-15%) and help in cases of proteinuria. In severe cases of hypertension causing TOD and unresponsive to amlodipine, direct vasodilators such as nitroprusside or hydralazine are an alternative. These medications require constant intensive monitoring as can cause hypotension or cardiovascular compromise.
Recommended reading

- IRIS guidelines and recommendations: www.iris-kidney.com

