

## Owner Information Sheet - Cerebrovascular Disease ('Stroke')

### Background

Cerebrovascular disease (CVD) is the term used to describe a group of conditions that are caused by disturbance to the normal blood supply to the brain. This can manifest as a 'stroke' or as short 'transient ischaemic attacks' (TIA). A stroke is the sudden onset of neurological abnormalities reflecting dysfunction of the brain due to disruption of its normal blood supply; these clinical signs last for more than 24 hours before generally showing a slow recovery. Similarly, a TIA refers to a sudden onset of brief neurological abnormalities reflecting disruption of the normal blood supply to the brain but these signs resolve completely in less than 24 hours (often within minutes to hours).

### Cause

Cerebrovascular disease can occur because of blood vessel blockage (ischaemic CVD) or blood vessel leakage or rupture (haemorrhagic CVD). This may occur secondary to an underlying condition that increases an animal's risk of forming blood clots or to bleed, with risk factors including kidney disease, endocrine (hormonal) disease (e.g. Cushing's disease, hypothyroidism), immune-mediated disease, cancer, heart disease, infections (e.g. sepsis), bleeding disorders (e.g. secondary to lungworm), vascular malformations, high blood pressure (usually associated with another underlying disease) and trauma. Atherosclerosis (where fatty deposits cause hardening of the blood vessel walls) is a common cause of ischaemic stroke in humans but is rare in dogs and unreported in cats. However, in a significant proportion of patients with CVD, an underlying cause is not found despite extensive testing.

### Clinical signs (symptoms)

An *ischaemic stroke* is characterised by a very sudden onset of neurological abnormalities that either do not worsen, or only worsen for a short period of time (usually less than 24 hours), before remaining static or improving. The neurological signs of a *haemorrhagic stroke* may have a more gradual onset and a longer period of progression. The neurological signs that are observed reflect the area of the brain affected and will therefore differ from patient to patient. Cavalier King Charles spaniels and greyhounds are reported to be predisposed to CVD.

### Diagnosis

In cases of suspected CVD, routine blood testing, blood pressure measurement and evaluation of the back of the eyes are indicated prior to advanced imaging (e.g. MRI) of the brain +/- cerebrospinal fluid sampling. These tests are performed in order to rule out other possible causes of the presenting neurological signs (e.g. brain tumours or meningitis), and to confirm whether ischaemic or haemorrhagic CVD has occurred. MRI of the brain is the gold standard test in these cases. If CVD is confirmed or suspected, further diagnostic tests may be performed to further investigate underlying diseases that could have predisposed to stroke or bleeding. This could include additional blood tests, urine testing, imaging of the chest and abdomen, and

evaluation of heart structure and function. Identification of predisposing factors is important so that these conditions can be treated, if possible, and so that the chance of further strokes or bleeding is reduced. Previous studies have suggested that an underlying disease is identified in around 50% of dogs with CVD.

### **Treatment and prognosis**

Treatment generally consists of supportive care alongside management of any diagnosed underlying diseases/risk factors. The prognosis for patients with CVD with no underlying risk factors is generally considered fair to good, and neurological abnormalities generally show a gradual improvement over time. Unfortunately, the presence of an underlying medical condition in patients with CVD is associated with a shorter survival time and an increased risk of recurrence.

Your veterinary neurologist or primary care veterinarian will discuss in more detail with you the prognosis for recovery and the expectations of treatment on an individual basis.

If you have any concerns about your dog or their treatment, do not hesitate to contact your veterinarian.

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