Cognitive Dysfunction Syndrome (CDS)

Cognitive Dysfunction Syndrome (CDS) is an age-related neurodegenerative disorder that is characterized by gradual and progressive cognitive decline. CDS has many similarities to Alzheimer's Disease in humans.[21]

Risk factors

Age

14% of dogs aged 8 and older are affected with CDS, but only 1.9% are diagnosed

The incidence and risk of CDS increases with age

41% the estimated incidence in dogs over 14[22]

Why does CDS occur?

- Changes in brain structure, and consequently in cerebral energy metabolism, have been reported[23]
- Aging reduces the brain's ability to metabolise glucose, which in turn affects factors such as memory, learning, attention and decision making

Clinical signs

Clinical signs of CDS can be grouped into 6 main categories which can be remembered using the acronym DISHAA:

- **D** Disorientation
- **I** Interaction - Social relationships
- **S** Sleep/wake cycles altered
- **H** House soiling
- **A** Activity altered (decline in activity, restlessness, repetitive movements)
- **A** Anxiety

«75% of owners of dogs over 7 years old have noticed at least one sign of CDS[24]».

Treatment

While CDS cannot be cured, cognitive deterioration can be slowed and clinical signs improved.[23]

- Early diagnosis and intervention can help improve the dog's quality of life
- Intervention can include and/or combine medications, therapeutic nutrition and environmental enrichment
- Medications used in the treatment of CDS include: Selegeline, Propentofylline, and Nicergoline
- Nutritional therapy is designed to reduce oxidative stress and address the decline in cerebral glucose metabolism that is associated with cognitive decline

Diet as an adjunctive treatment

- Medium chain triglycerides (MCTs), which are easy to digest, are converted to ketone bodies which provide an alternate energy source for the brain and improve mitochondrial function
- Antioxidants could reduce brain oxidative stress
- Arginine supports healthy circulation, blood pressure and brain function
- B vitamins support energy metabolism and DNA maintenance

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Understanding dog's Epilepsy and Cognitive Dysfunction Syndrome

PURINA® Your Pet, Our Passion.®

Epilepsy

Epilepsy is a chronic, debilitating disease that affects between

1–5% of canine patients in referral hospitals

Up to **0.6%** in first opinion practice[1].

There are several different types of epilepsy, but idiopathic epilepsy (unknown origin) is the number one condition in dogs diagnosed with neurological disease.[2]

Epilepsy not only reduces the quality of life of the affected pet, but also reduces the owner's quality of life due to the uncertainty about when the next seizure will occur.[3]

Why seizures occur

Seizures start when neurons inside the brain experience abnormal electrical excitability. Under normal conditions, the brain prevents this abnormal electrical excitability by several inhibitory mechanisms, but seizures occur when the balance between the excitatory and inhibitory transmission mechanisms are disrupted.[7]

Seizures are sudden and unpredictable. For owners, this creates a constant feeling of uncertainty which often leads to emotional distress

Risk factors

Predisposed breeds (genetic factor)

Border Collie, Boxer, Cavalier King Charles Spaniel, Golden Retriever, Labrador Retriever, Irish Wolfhound or Dachshund.[4]

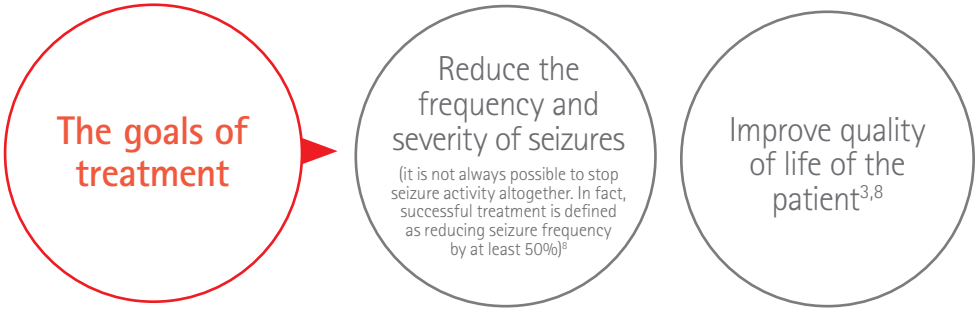
Age

Epileptic seizures usually start between 6 months and 6 years of age.[5]

Gender predisposition

males > females[6]

Treatment



Treatment with antiepileptic drugs (AEDs)

AEDs such as phenobarbital and potassium bromide are commonly used to reduce the incidence of seizures.[6]

- While effective, these medications are associated with side effects (polyphagia, weight gain, polydipsia, polyuria sedation, restlessness, lethargy and ataxia)
- Adverse side effects of AEDs are one of the top reasons cited by pet owners for a decreased quality of life[9]
- Finding a dose that balances seizure control with the mitigation of side effects is important

More than

66%

of dogs with idiopathic epilepsy have seizures long-term

20–30%

of affected dogs remain poorly controlled, despite treatment.[10-13]

How to achieve successful treatment?

To achieve a successful outcome, owner and patient compliance is key. Is important to ensure that the owner is administering the medications exactly as prescribed. Intermittent drug administration could lead to worse consequences than a lack of treatment.

For this reason, it is necessary to find an adjunctive treatment to help improve the clinical signs of epileptic dogs.

Ketogenic diets

The objective of this type of diet is to increase the blood concentration of ketone bodies (an alternative and efficient energy source for the brain useful in situations of glucose hypometabolism[17]). There are two main types of ketogenic diet:

1. Traditional ketogenic diet[18]:

- High fat/low protein/low carbohydrate diet
- Used to manage epilepsy in children
- Some studies demonstrate that traditional ketogenic diets do not improve seizures in dogs as they do in humans, because dogs do not easily become ketotic

Diet as an adjunctive therapy

- Glucose is the main energy source for the brain[14]
- Brain glucose metabolism is disrupted in patients with epilepsy (glucose hypometabolism)
- Although increased energy is used during seizures, dogs with idiopathic epilepsy demonstrated reduced glucose utilisation in various locations of the brain between seizures[16]
- Compromised brain glucose metabolism in epileptic patients creates a need for alternate sources of brain energy[15, 16]

2. Diets enriched in MCTs (metabolically ketogenic diets):[19]

- Fat is the most concentrated energy source available; however, the brain is limited in its ability to use long chain triglycerides (LCTs) as an energy source. Dietary medium chain fatty acids (MCFAs) from medium chain triglycerides (MCTs), however, can be readily oxidized to serve as an alternate energy source (ketone bodies)
- Dogs can metabolise MCTs to produce ketones
- A study conducted in dogs with idiopathic epilepsy at the Royal Veterinary College in London (in partnership with Purina) demonstrated for the first time that a test diet with MCT oil can have positive effects on reduction of seizure frequency when fed as an adjunct to veterinary therapy
- Diets rich in MCT oil can have a direct effect on nerve impulse transmission[20]
- A specific type of MCT called Decanoic acid, administered at relevant concentrations could act as an antagonist of a neuron activity transmitter
- This effect could be beneficial in animals suffering from seizure activity

Results