



Cognitive Dysfunction Syndrome

Basics

OVERVIEW

- Syndrome associated with brain aging
- Leads to changes in the pet's awareness, decreased responsiveness to stimuli (external signals), and deficiencies in learning and memory
- Pet may have increasing signs of agitation and anxiety with advancing age
- Subtle signs are seen in early stages, referred to as “cognitive decline”

GENETICS

- May have a genetic correlation with respect to the distribution of beta-amyloid in the brain and the age at which it begins to accumulate

SIGNALMENT/DESCRIPTION OF PET

- Dogs and cats
- More common with increasing age; clinical signs of cognitive dysfunction have been identified in 14.2% of dogs over 10, and 41% of dogs over 14 years of age
- Dysfunction has been identified in 35% of cats over 10 years of age, and 50 % of cats over 15 years of age
- A decline in memory and learning on tests can be seen in dogs and cats as early as 6-8 years of age
- Deficits may not be noticed by pet owners until several years after initial decline, except in dogs trained to perform more specialized tasks (such as hearing ear, seeing eye, drug detection, agility)

SIGNS/OBSERVED CHANGES IN THE PET

Historical Findings

Most clinical signs can be placed into 5 categories (using the acronym DISHA):

- *Disorientation*, including getting lost in familiar environments, confusion, or inability to navigate through familiar routes (such as going to the wrong side of door)
- *Interactions* with humans or other animals may be altered (increased attention seeking, decreased interest in play/affection, or an increase in irritability)
- *Sleep-wake cycle alterations* (temporal disorientation), including night waking or vocalization and perhaps an increase in sleep during the day
- *Housetraining* and other previously learned behaviors might deteriorate; house soiling, lack of response to previously learned commands, or becoming less adept at performing learned tasks (such as agility, working ability) may occur



- *Activity* may be altered—inactivity, less interest in exploration, reduced self-care, or even reduced eating; however, as the condition progresses, activity levels may increase with signs of restlessness, pacing, aimless wandering, or compulsive activity disorders (such as excessive licking)
- Anxiety and agitation may increase in pets with cognitive dysfunction
- Pets with existing signs are more likely to develop additional signs over the subsequent year

Physical Examination

- No specific abnormalities related to cognitive dysfunction syndrome are seen; pet may have non-related physical changes or health concerns

CAUSES

- Exact cause is unknown and pets are variably affected
- Age-related degenerative changes may be contributed to by the environment (diet, stress, lack of enrichment), there may also be genetic factors involved

RISK FACTORS

- Chronic or recurrent illness or stress might lead to increased accumulation of toxic free radicals in the brain
- Conditions that affect the blood supply to the brain (such as systemic high blood pressure [hypertension], low red blood cell count [anemia])

Treatment

HEALTH CARE

- Outpatient care
- Depends on the type and severity of the clinical signs of cognitive dysfunction

ACTIVITY

- Maintain as much exercise, play, training, work, and other daily routines as is practical for the pet's age and health
- Providing mental and physical stimulation has been shown to reduce the chance or slow the progression of decline in function

DIET

- Selected based on the pet's overall health assessment
- If the pet's overall health does not require a special therapeutic diet, then a senior diet that has demonstrated effectiveness in improving cognitive function should be fed; the veterinarian may select specially designed prescription diets that have been shown to improve memory, learning ability, and clinical signs of cognitive dysfunction syndrome; the diets are supplemented with antioxidants (such as vitamins E and C), beta-carotene, flavinoids, omega-3 fatty acids (DHA, EPA), carnitine, and alpha-lipoic acid, and in some other diets, MTC (medium chain triglycerides)
- Some natural supplements may help to improve the signs or to slow the decline of cognitive dysfunction; talk to your veterinarian before adding supplements to your pet's diet

Medications

- Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered as all inclusive

Selegiline

- Licensed for use in dogs in North America
- Monoamine oxidase (MAO) B inhibitor, may contribute to improved transmission of brain chemicals, lead to a decrease in free radicals, and have a protective effect for nerve cells in the brain; the veterinarian will reevaluate clinical signs for improvement after 1 to 2 months of therapy
- Side effects might include occasional gastrointestinal upset, and restlessness, and repetitive behavior at higher doses

PROPENTOFYLLINE

- Not licensed for use in dogs in North America but is licensed in other countries
- Reported to inhibit platelet aggregation and clot (thrombus) formation and increase blood flow
- For use in the treatment of dullness and lethargy in old dogs
- May increase oxygen supply to the central nervous system without increasing glucose demand

NICERGOLINE

- May improve function by dilating the blood vessels in parts of the brain

GENERAL COMMENT REGARDING CATS

- No drugs are approved by the federal Food and Drug Administration (FDA) for the treatment of cognitive dysfunction syndrome in cats; your veterinarian will discuss the risks and benefits of medical treatment
- Selegiline, propentofylline, and nicergoline have been used and might be effective in cats

Other Drugs

- Adrafinil or modafinil to improve alertness and exploration
- Anti-inflammatory medication, hormone replacement therapy, curcumin and ginkgo biloba extract might be considered based on preliminary work in other species
- Medication used in humans for Alzheimer's disease might be useful, but doses have not been determined for pets; potential side effects include nausea, vomiting, diarrhea, and sleep-wake disturbances
- Anxiety-decreasing drugs (known as “anxiolytics”), such as buspirone; drugs to help induce sleep, such as benzodiazepines; or antidepressants, such as fluoxetine (but not in combination with selegiline) might be considered to treat anxiety and apathy
- Homeopathic and natural supplements might help to normalize sleep-wake cycles or reduce anxiety (for example, melatonin, valerian, l-theanine, alpha-casozepine)

Follow-Up Care

PATIENT MONITORING

- If a diet or medication is dispensed, then response to therapy will be evaluated after 30–60 days and the dose adjusted or treatment changed if the pet has insufficient improvement
- If the pet is stable, twice-yearly checkups are recommended for senior pets unless new problems arise before a reassessment is due

PREVENTIONS AND AVOIDANCE

- Diet and enrichment may be in part preventive
- Maintaining a stimulating environment and as much activity as is practical for the pet's age and health may help to prevent or delay the onset of cognitive decline
- Early intervention is the best way to slow the progression of cognitive dysfunction

EXPECTED COURSE AND PROGNOSIS

- Diet and medication should control the clinical signs and slow progression in a majority of cases
- Cognitive decline may advance and other health problems are likely to arise despite medical intervention because of the pet's increasing age

Key Points

- Realistic expectations must be understood; treatment is aimed at slowing the progression of the disease, not at curing the pet
- Signs are generally progressive
- Lifelong therapy is required
- Additional medications may be necessary if the pet has multiple health problems
- Any changes in the pet's health or behavior should be reported to your veterinarian immediately, as this may be due to cognitive dysfunction or the emergence of new health problems

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