

SENIOR DOG BEHAVIOR PROBLEMS: MEDICAL OR BEHAVIORAL

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Cognitive dysfunction syndrome (CDS) is a neurodegenerative disorder of senior dogs associated with progressively advancing brain pathology including a decrease in frontal and temporal lobe volume, a reduction in neurons, compromised cerebrovascular circulation, a decline in cholinergic function, an increase in toxic free radicals, and deposition of beta-amyloid and phosphorylated tau. Behaviorally CDS is expressed by a decline in learning, memory, perception, and awareness, and altered social interactions, sleep and activity. The diagnosis is based on clinical signs described by the acronym DISHAA including **D**isorientation, altered social **I**nteractions and **S**leep-wake cycles, loss of **H**ousetraining and other learned behaviors, **A**nxiety, and **A**ctivity. While a decline in learning and memory may be the hallmark signs of CDS, the average pet may appear minimally challenged until the dysfunction becomes severe. Using neuropsychological tests, executive function, attention, and memory impairment can be objectively quantified in the laboratory with deficits as early as 6 years of age.¹ For screening a number of questionnaires are available ranging from those with broader, more sensitive and less specific screening to identify all potential signs (DISHAA) to those validated for specificity (CADES, CCDD).²⁻⁵

CLINICAL SIGNS OF CDS

The distribution of signs of CDS varies between studies with differing methodologies, questionnaires and population distributions. In one study the most common signs in dogs with marked CDS displayed sleeping more during the day and restlessness at night (57%), altered social interactions (51%), disorientation (49%) and anxiety (46%). For dogs with mild CDS, the principal sign was increased daytime sleep (70%) with anxiety in 11%.⁶ By contrast, the distribution of owner reported behavior problems based on a referral practice caseload, are indicative of the scope and type of behavior problems that are of sufficient concern to pet owners to seek counseling. Of 270 referred cases of dogs over 7 years of age, 32% were aggressive to family members, 16% aggressive to family dogs, 9% barking, 8% separation anxiety, 6% disorientation 5% aggressive to unfamiliar people, 5% housesoiling, 4% destructive, 4% compulsive and 3% noise fears (3%).⁷

PREVALENCE AND PROGRESSION

Prevalence of CDS increases with age, ranging from 5% to 28% in 10-12 year old dogs to 41% to 68% or higher for dogs >14.5,⁸ Over the course of 6 months, 40% of dogs with no impairment progressed to mild impairment and 24% with mild impairment progressed to moderate.⁵ A considerable deterioration in activity and play, response to commands, and fears and phobias has been reported with commonly reported increases in deterioration or frequency over 6 months.⁸

BEHAVIOR SIGNS IN SENIOR PETS – PROACTIVE SCREENING

As initial signs of CDS may be subtle, most cases go undiagnosed until the signs become sufficiently problematic for the pet owner to report.⁵ In one study of dogs 10 years and over, while prevalence was 14.1%, only 1.9% of dogs had been identified and diagnosed.³ In addition, pet owners may not be aware that any change in behavior may indicate not only CDS but underlying health and welfare issues. Therefore, pet owners should be counselled that early identification and reporting, provides the best opportunity for prompt diagnosis and early intervention to address health and welfare, improve signs and potentially slow decline.

A proactive approach to senior care should include twice yearly visits for examination (veterinary screening), laboratory tests (diagnostic screening) and screening with a behavioral questionnaire (per owner screening). In a recent trial of 100 healthy senior and geriatric dogs, 53 had increased systolic blood pressure, 22 had heart murmurs, over 20% had hypophosphatemia, leukopenia, increased serum creatinine, ALT, or alkaline phosphatase,

leukopenia, and 4 had bacterial cystitis. Platelets were significantly higher and temperature, HCT, albumin and TT4 were lower in geriatric compared to senior dogs.¹⁰

DIAGNOSIS OF CDS

While CDS may cause or contribute to the behavioral signs, medical causes must first be ruled out. However, the diagnosis is complicated by the fact that senior pets are likely to have other health issues concurrent with CDS. With advancing age, senior pets are increasingly more prone to disease arising in part from weakening of the immune system, a decline in organ, sensory and cognitive dysfunction, and an increase in neoplasia and conditions associated with pain and discomfort (e.g. osteoarthritis). Particular attention is needed to rule out neurological, gastrointestinal, painful conditions and sensory decline where the sole signs may be behavioral.¹¹

a) Behavior of illness: Illness results in behavioral signs both as a consequence of the illness itself (fever, discomfort, pain) and as a mechanism for healing and staying safe from harm. Signs might include a decrease in activity and mobility, hiding, and changes in vocalization, grooming, appetite, drinking, and social behavior (irritability, avoidance, aggression, comfort seeking)

b) Neurological: A neurological cause should be suspected if there are neurological deficits or if the pet has concurrent signs of increased sleep, altered mental status, cranial nerve, sensory or motor deficits, seizures, tremors, altered eating or drinking, emesis, appearing blind or lost, pacing, circling to one side, or head pressing. However, behavioral signs may precede any of these signs. Pets should also be monitored over time since neurological signs are likely to be progressive. A change in personality or mood, inability to recognize or respond appropriately to stimuli, and loss of previously learned behavior might indicate forebrain involvement. Diseases affecting the limbic system and hypothalamus can affect emotional state.

c) Sensory dysfunction or motor dysfunction can cause or contribute to altered responsiveness to stimuli, increased fear, anxiety and aggression, hiding / avoidance, reduced ability to cope with change, altered appetite, as well as decreased desire to go outside, go for walks, climb or jump.

d) Pain can have both behavioral and physical signs that vary with the source of pain (e.g. gastrointestinal, dental, otic, ophthalmic, abdominal, musculoskeletal) and type of pain (nociceptive, inflammatory, neuropathic). Behavioral signs might include altered response to stimuli, a decline in activity, a change in behavior, alterations in normal daily activities, restlessness, increased irritability or aggression, hiding and avoidance, vocalization, night waking, or housesoiling. In fact, pain may cause or contribute to any of the signs of DISHAA. If pain is a possible or suspected cause of behavioral signs, a therapeutic response trial might be indicated. Pain should be assessed and recorded at every visit, using assessment scales for both acute and chronic pain.

e) Endocrine diseases which result in either an increase (hyper) or decrease (hypo) in hormones and corresponding effects on behavior. In dogs, hyperadrenocorticism, hypothyroidism, and diabetes would be most common, although hypo-adrenocorticism, hyperthyroidism and insulinomas are more rarely seen. Endocrine disorders particularly hyperadrenocorticism can contribute to any of the DISHAA signs including altered activity levels, decreased interest in play, fear, anxiety and irritability, housesoiling, altered sleep wake cycles, as well as panting, altered drinking and appetite.

f) Hepatic disease may lead to behavioral signs related to altered absorption, digestion and breakdown of nutrients, pain, discomfort, and hepato-encephalopathy. Signs might include avoidance, irritability, aggression, altered sleep, listlessness, confusion, ataxia, and repetitive behaviors (e.g. staring, pacing).

g) Cardiovascular: Compromised circulation, hypotension and hypertension may alter blood flow to the brain leading to CNS of CDS. Cardiovascular disease can cause exercise intolerance, reduced activity, anxiety, lethargy, altered social interactions, reduced awareness, altered sleep and confusion.

h) Gastrointestinal: Any disease associated with increased intestinal motility, diarrhea, constipation, or decreased control may cause house soiling. Diseases of the GI tract causing pain, discomfort and nausea may lead to altered appetite, anxiety, irritability, night waking,

repetitive pacing, vocalization, avoidance, as well as lip licking, environmental licking, stretching, sucking, and pica.

i) Drug therapy: The potential effects on behavior with any medications the pet is taking should be considered. In one study, dogs on glucocorticoids were significantly less playful, more nervous, more fearful, less confident, food aggressive, more prone to bark, startle, and react aggressively when disturbed and avoid people or unusual situations.¹²

j) Hypertension: Hypertension is most commonly associated with renal, endocrine and circulatory disorders. Signs include night waking, vocalization, confusion, irritability, aggression and altered activity.

STRESS AND ITS EFFECTS ON HEALTH AND BEHAVIOR

While it is essential to consider the effects of disease on behavior, stress will have an impact on health as well as behavior through its effects on the HPA axis and noradrenergic system. Stress is an adaptive measure that triggers psychological, behavioral, endocrine and immune effects that are designed to handle stress (return to homeostasis). However, with chronic or persistent stress, stress contributes to reduced immune function leading to increased susceptibility to infection and delayed healing, cardiovascular, respiratory, gastrointestinal, urogenital and respiratory disease, oxidative stress, cellular aging, dermatologic conditions and behavioral disorders.

TREATMENT

A detailed discussion of treatment for cognitive dysfunction is beyond the scope of this seminar. Strategies that might slow the progression and improve signs of CDS include drugs, functional foods and nutritional supplements focused on reducing the effects of oxidative stress, correcting metabolic changes associated with cognitive decline, and improving mitochondrial function, neuronal health and signaling. In addition, both mental and physical enrichment may play an important role in improving cognitive function and slowing decline. In fact, the combination of nutritional therapy and behavioral enrichment has been demonstrated to slow the progression and improve the clinical signs of cognitive dysfunction.¹³ Drugs, supplements and functional foods may also be indicated, together with environmental management and behavior modification to manage underlying stress and address those signs such as night waking, agitation and anxiety that continue to be problematic for the owner and pet

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