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The geriatric patient: check-up exams for elderly dogs and cats

With the change in relationships from working dogs to companion dogs and cats, the expectation of owners to keep their pets for as long and as healthy as possible has increased.

After their active period of life, dogs or cats should be able to grow old without impairments.

It is rare to have healthy elderly patients in a practice. Starting a prophylactic program in a timely manner can help increase the number of animals that do remain healthy.

The aim of prophylactic check-ups in elderly dogs and cats is to recognize risk factors for diseases such as obesity, inadequate dental hygiene, and stress, as well as to recognize hidden problems and to initiate the appropriate preventive or therapeutic treatment. This can lead to a longer symptom-free life with a good quality of life. In addition, early recognition of disease and initiation of therapy is often less expensive and more effective.

Regular check-ups that begin when an animal is still healthy have the advantage that individual physiological parameters like laboratory values can be collected and changes can be observed over time. That way, changes can be detected even if a value is theoretically still within a given reference range.

Laboratory testing is an integral part, but not the main focus, of check-up exams. The AAHA (American Animal Hospital Association) and the AAFP (American Association of Feline Practitioners) have published recommendations:

https://www.aahanet.org/Library/SeniorCare.aspx
and
http://www.catvets.com/guidelines/practiceguidelines/senior-care-guidelines

Practice analyses in the USA have shown that approximately 40% of the prophylactic examinations lead to additional diagnostic testing or t herapies.

Because preparing the patient as well as adequate history taking and consultation can be time consuming, it is advisable to make an appointment for a check-up. This can be combined with a targeted invitation to the patient. When starting a check-up program, this can also be combined with the timing of vaccinations. Later, extra appointments should be included.

How old is a senior?

Dogs are generally considered elderly when they have reached 75% of the typical life expectancy for their breed. As a rule of thumb, >9 years of age, 2 years earlier for large breeds, can be used for dogs. Prophylaxis programs should begin 2 years earlier.

Cats are divided into mature at 7-10 years, seniors at 11-14 years, and geriatric at >15 years.

Which parameters are tested?

The AAHA recommends that a “senior health check” include, in addition to a detailed history and thorough clinical exam, blood pressure and laboratory testing of urine, blood, and serum. These should be done biannually for geriatric animals, at least annually before that. In order to determine the functionality of important organ systems, the following parameters should be determined in the laboratory:

- Urinalysis
- Complete blood count
- Clinical chemistry:
  Total protein, albumin, globulin, urea, creatinine, ALT, AP, Na, K Ca, P and T4 for cats

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Recent studies show that additional parameters are useful for the early detection of diseases. We have therefore added SDMA or the urine protein/creatinine ratio (U P/C), fructosamine, lipase, as well as several other parameters to our geriatric profile. Urinalysis is not included, since that is often done directly in the practice. If necessary, it can also be done in the laboratory.

The Troponin I concentration is helpful for determining the cardiac status

CPSE is a marker for prostate hyperplasia and testing is recommended for intact male dogs.

Preanalytics

Animals should be presented with an empty stomach (cats: fasted for 8-10 hours, not longer) in order to reduce interfering factors.

Sample material: spontaneous urine can be used for U P/C, EDTA whole blood for the complete blood count, and serum for the clinical chemistries and T4. Centrifuged, cooled serum or EDTA or heparin plasma is necessary for Troponin I and CPSE.

Organ systems and changes in laboratory values

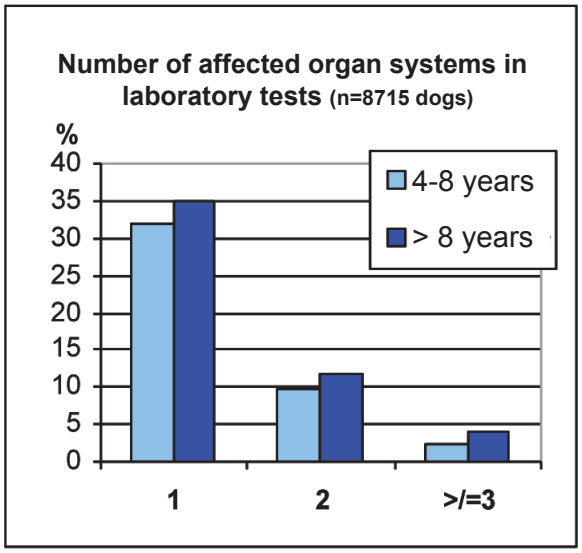
Not all organ systems are affected equally by aging. Many factors that the body deals with during the course of its life influence various organs or functional systems. For many diseases that occur increasingly in old age, the pathogenesis cannot be attributed to a causative agent.

Genetic predisposition also influences this, in addition to previous disease processes. Participation in high-performance sports can also have an influence.

Disease processes of the liver, kidney, cardiovascular system and the musculoskeletal system are classically associated with aging.

Generally, these diseases are chronic, e.g. CKD (chronic kidney disease), cHCM (chronic hypertrophic cardiomyopathy).

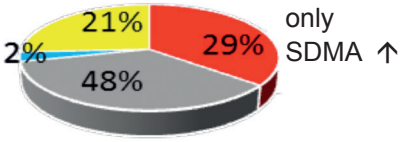
Many endocrinopathies are also increasingly prevalent in old age, including thyroid disease and diabetes mellitus in dogs and cats and Cushing's disease in dogs. Since no organ system functions alone but is always influenced by others or influences others, normal blood values become rarer in old age and the percentage of animals in which parameters for more than one organ system are abnormal increases.



• Kidneys and urinary tract

Kidney values (SDMA, creatinine)

On average, creatinine values are slightly lower in elderly animals with "healthy kidneys" than in young or middle aged animals. This has to do with the reduction of musculature in old age, especially in animals that have musculoskeletal problems and are therefore less active. Cats with hyperthyroidism generally have low creatinine levels due to muscular atrophy. The creatinine concentration in the blood is lowered by the associated increased renal perfusion. This causes an increase in the "creatinine blind" region, in which the glomerular filtration rate (GFR) is reduced, but the creatinine value is not increased above the reference range.



SDMA and creatinine in cats
(yellow: SDMA + crea normal;
blue: only crea ↑;
grey: SDMA + crea ↑;
red: only SDMA ↑)

SDMA is helpful in this creatinine blind region. SDMA is produced at a constant rate from arginine and is excreted exclusively by the kidney without further metabolisation. It is therefore a reliable marker for the glomerular filtration rate (GFR). SDMA increases after an approximately 30% reduction in GFR, creatinine only increases reliably after a 70% reduction. A study has shown that in cats, SDMA increased above normal levels a year before creatinine did. The SDMA concentration is independent of body mass and therefore allows detection of renal insufficiency when the creatinine value is still within normal limits.

Urinalysis
This is not included in the profile, but is no less important. Urinary tract infections are common accompanying illnesses in kidney insufficiency, prostate hyperplasia, hyperthyroidism, diabetes mellitus, and hyperadrenocorticism AND they are not noticed by >80% of pet owners. An increase in protein and/or glucose excretion can be an indication of unremarked subclinical diseases such as diabetes mellitus or hyperadrenocorticism, nephropathies or certain neoplasms. Increased bilirubin excretion can be an indicator for hepatopathies.

• Hepatopathies

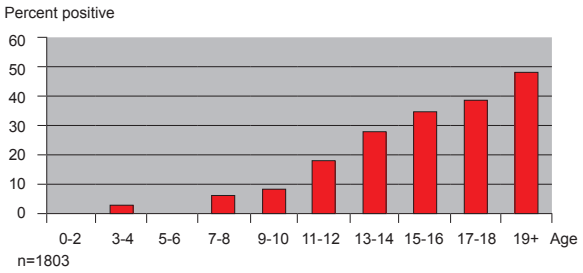
Liver enzymes (ALT, GLDH, AP)
Hepatopathies are not typical for elderly patients. However, the regenerative powers of the liver decrease with increasing age and noxious effects on the liver, e.g. by infections, intoxications, cardial and metabolic diseases, are less well compensated for with increasing age. Increased liver values provide an indicator for actual or (especially in old age) chronic strains on the liver.

• Hormonally induced diseases in old age

It is always important to recognize endocrinopathies early on and to make informed decisions about possible therapies. Clinical signs associated with hyperthyroidism such as proteinuria, increased blood pressure, cardiac hypertrophy, can be avoided or reduced if the problem is diagnosed and treated in time. If T4 values are minimally increased, TSH should be determined to confirm the diagnosis.

In dogs, hypothyroidism is not necessarily a disease of elderly animals. Disease development often begins with 2-6 years of age. Nevertheless, clinical signs are often only noted with advancing age. A subclinical hypothyroidism does, however, influence many other organ systems such as the cardiovascular, immune, and many other systems, and should therefore be recognized early on.

Thyroid values – cats



Thyroxin in cats: percentage of animals with increased levels according to age.

Diabetes is among the most common endocrinopathies of elderly dogs and cats. 5.8% of elderly dogs and 8.8% of cats had increased fructosamine concentrations in our laboratory. Measuring fructosamine concentrations, as opposed to only measuring glucose, has the advantage that it is not influenced by transient stress hyperglycemia, which can be caused by a visit to the vet.

Hyperadrenocorticism, or Cushing's syndrome, is an endocrinopathy of middle aged dogs. It is often characterized early on by increased AP and increasing fructosamine concentrations and a stress leukogram. Additional parameters such as heat stable AP – the isofraction of AP induced by corticosteroids – can offer additional information.

• Lipase

Pancreatitis can occur at any age. In elderly patients, it often remains unrecognized due to overlapping clinical signs of multiple diseases. Measuring lipase using the DRRG method offers a clear indicator for a pancreatitis. In order to confirm the diagnosis, cPLI can be used as a follow up test.

• Total protein, albumin and globulin

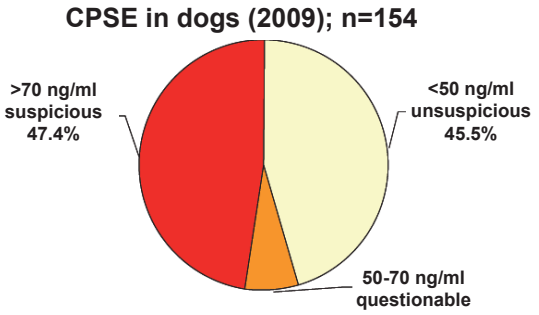
Most diseases influence one or more protein fractions. Both an increase in total protein and increased globulin as well as decreased albumin are more common in older animals than in young adults. These changes can be interpreted together with clinical signs or with other laboratory parameters and are a piece of the mosaic for the total health evaluation.

• Cardiac Troponin I

Almost all diseases that an organism goes through during the course of a lifetime also strain the heart muscle. Chronic diseases or endocrinopathies – even if they are therapeutically under control – can cause long term damage to the myocardial cells. Troponin I is a structural protein of myocardial cells that is physiologically only present in extremely low concentrations in the blood. Determining the Troponin I concentration can help determine the extent of damage to the myocardium. Measuring before and during therapy can also help determine whether damage to the heart is caused by the identified disease process, or if other diseases are causing continuing damage to the myocardium.

• CPSE (canine prostate specific arginine esterase)

Benign prostate hyperplasia (BHP) is a common finding in elderly intact male dogs. Clinically, these dogs may have e.g. difficulty defecating, haematuria, cystitis, perineal hernias, as well as prostatitis or prostate cysts. The enzyme CPSE is secreted by the prostate cells, under the control of sex steroids, especially testosterone. If the prostate cells become hyperplastic, CPSE values increase significantly. Statistical evaluation of CPSE values shows that prostate hyperplasia is a relevant problem in intact male dogs.



Complete blood count

A complete blood count is an important part of any laboratory exam, regardless of the species and age of the animal. In geriatric patients, it can, among other things, help to interpret other findings and provide indications for diseases that are not covered by other parameters.

Summary

Geriatric prophylaxis is a rewarding field. In addition to optimal disease prevention for patients, good support also leads to increased client retention and increased frequency of visits to the practice.

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