

# Common Geriatric Conditions

Deirdre Chiaramonte, DVM, DACVIM

New York, NY

The last AVMA survey revealed that 39% of the pet-owning population owned dogs that were older than seven years of age, defining the four life stages (pediatric, adult, senior, and geriatric). As we know old age is not a disease but is associated with changes related to age, which are also influenced by genetics, environment, nutrition and lifestyle.

During the aging process there is a physiological decline of major organ systems. This alters the response to stressors, infections, drugs, and foods, etc. At the 'tipping point' – all physiological reserves are exhausted. Before this point there are often subtle, unidentified changes until the patient is stressed by illness, anesthesia, or medications. Many of these diseases can often be diagnosed on senior wellness panels, which include a complete blood count, a serum chemistry profile, a urinalysis, endocrine screening and imaging.

With increases in age the basal metabolic rate decreases. The consequences of this include weight gain with a corresponding decrease in caloric intake, they become cold intolerant as less metabolic heat is generated and a decrease in cell turnover in the gastro intestinal tract which makes them less tolerant of some medications such as non-steroidal anti-inflammatory drugs and therefore more susceptible to ulceration.

The functional reserve of the cardiovascular system is reduced due to myocardial fibrosis and free wall thickening. This causes reduced efficiency, ventricular filling, and cardiac output. The end result is altered blood flow to organs. Compensatory mechanisms such as an increase in stroke volume occur. Lung compliance decreases and alveolar elasticity is lost. This results in decreased arterial oxygenation. This is especially concerning during anesthesia and hot weather.

There is a common age related decline of the renal system that is very difficult to quantify initially (even hard to detect 50% nephron loss). Proper assessment of the renal system requires accurate estimate of water intake and urine output, a thorough history and physical examination. Obtaining a complete blood count, a serum chemistry profile and urinalysis and urine culture is paramount. Aging kidneys have decreased renal blood flow, decreased glomerular filtration rate, and a decreased ability to concentrate urine. This is especially concerning with commonly prescribed medication to seniors such as non-steroidal anti-inflammatory medications.

Thermoregulation is altered as heating and cooling functions decrease with age, therefore they are more prone to heat stroke and cold. Oxygen exchange is inefficient. Seniors have less subcutaneous fat to insulate them. This combined with decreased basal metabolic rate lead to shivering, sleep cycle disturbances and a reluctance to go outside and eliminate. These seniors are more susceptible to anesthesia related hypothermia.

Decreased hepatic mass leads to decreased function. The decreased cardiac output to the liver results in a decrease in coagulation factors, glucose and plasma proteins. The most common age related hepatic changes are fatty infiltration of hepatocytes and nodular hyperplasia. These can be responsible for mild elevations in serum alkaline phosphatase found commonly in older dogs.

Aging causes a generalized decrease in skeletal muscle cells. There is muscle fiber fibrosis and decreased sensitivity to ATP. This becomes most obvious with atrophy of the quadriceps, semimembranosus, semitendinosus and biceps femoris. This atrophy leads to more disuse and more atrophy resulting in hind limb locomotion inabilities such as inability to get into the car or up the stairs. They cannot follow the family as much nor pasture to defecate.

Suggested age-related changes to the gastrointestinal tract include impaired swallowing, decreased gastrointestinal motility, decreased gastric acid secretions, decreases in digestive enzymes and decreased absorptive capacities. Compounding this are a loss of olfactory neurons and loss of taste buds. This contributes to anorexia.

Loss of hearing is common. Decreased sound wave conduction contributes to deafness although neurogenic deafness is most common. Forty eight percent of dogs older than twelve years of age and 68% of dogs over sixteen years of age are hearing impaired. Normal age changes such as lenticular sclerosis are common but do not impair vision. Forty eight percent of dogs older than twelve years of age and 97% of dogs older than sixteen years of age are visually impaired.

Unfortunately the integumentary changes are most obvious to owners! Follicular atrophy leads to coat thinning. The decreased sebum production produces a dry, scale. The nails become long and brittle.

Personality changes are common in geriatric pets. They need increased attention and become jealous of other people and animals. They become more irritable and less tolerant. They sleep more and their sleep patterns altered, including pacing, panting, wanting to go out for no reason and are constantly fluffing their beds. This is known as cognitive decline, leading to decreased memory, learning, perception, and awareness. It becomes a quality of life issue eventually.

Canine cognitive dysfunction encompasses behavioral issues. The morphological changes accompanying age are brain atrophy, ventricular enlargement, white matter lesions and deposition of beta amyloid "senile plaques". There is increased oxidative stress and decreased glucose and oxygen metabolism due to a reduction in cerebral blood flow. These functional changes impair cognitive function.

Cognition refers to mental processes such as perception, awareness, learning, memory and decision-making. Brain pathology begins as early as seven years of age. Dogs have shown an age-dependent decline in learning and memory.

DISH(A) is an accepted acronym for evaluating older dogs. It stands for Disorientation - confusion or unable to recognise normal routines or surroundings. Interaction changes such as when dogs no longer greet family members, no longer welcome petting or asking for attention. Sleep activity changes when the dog sleeps more during the day or less at night. House soiling when the dog has frequent indoor accidents and doesn't "ask" to go outside and lastly Altered activity levels - dog is less active or exhibits repetitive and unproductive behaviour.

Treatment is a pronged approach incorporating medication and behavioral enrichment. Selegiline enhances dopamine in the cortex and hippocampus. It reduces glial cell damage, protects against free radical damage to nerve cells and promotes synthesis of nerve growth factors. Cognitive enrichment is a five step process incorporating mental stimulation, social companionship, interaction with other dogs, visual stimulation and variety.

Another common geriatric issue is osteoarthritis. Osteoarthritis is a common cause of pain and dysfunction. This is exhibited by reluctance to jump into the car, to go up the stairs, lags behind in walks, etc. Prevalence is high. The goals of treatment are to eliminate the underlying cause, which is rarely possible, and to reduce pain and inflammation associated with osteoarthritis.

The treatment plan is tailored to the individual. It can incorporate weight loss, environmental modifications, rehabilitation therapy, surgery, non-steroidal anti-inflammatory medications and pain medications. Pharmacologic management is aimed at decreasing inflammation and providing analgesia to improve patient function. Non-steroidal anti-inflammatories have been used for centuries to control fever and pain. As a class they inhibit the metabolites of arachidonic acid. They are used in multi-modal management of osteoarthritis. Current thinking is to use the NSAIDS consistently rather than PRN. If the pain is not regularly alleviated adverse affects occur such as decreased muscle, ligament and tendon health. Proper NSAID use can allow increased exercise, weight control, and pain relief.

Communication is a must with owners of a pet using NSAIDS. The owners must be informed of potential adverse effects. In cases of adverse side effects the FDA reports that 23% of owners state that veterinarians never discussed possible adverse effects, that 22% never gave the client the NSAID information sheet. The owners must be instructed to discontinue the drug immediately if adverse symptoms arise. The most common first adverse effect noticed is vomiting.

Other therapies that are beneficial to the care of the pet with osteoarthritis are rehabilitation therapy, acupuncture, and supplements or nutraceuticals.