



Amyloidosis

(Disorder Caused by
Deposition
of Proteins [Amyloid] in
Various Organs)

Basics

OVERVIEW

- A group of conditions of differing cause in which insoluble proteins (amyloid) are deposited outside the cells in various tissues and organs, compromising the normal function of the tissues or organs

GENETICS

- No genetic involvement is established clearly; occurs in certain lines or families (known as “familial amyloidosis”) in the following dog breeds: Chinese shar-pei, English foxhound, and beagle; and in the following cat breeds: Abyssinian, Oriental shorthair, and Siamese

SIGNALMENT/DESCRIPTION OF PET

Species

- Dogs
- Cats
- Uncommon disease in domestic animals; occurs most commonly in dogs; rare in cats, except Abyssinians

Breed Predispositions

- Dogs—Chinese shar-pei, beagle, collie, pointer, English foxhound, and walker hound; German shepherd dog and mixed-breed dogs are at lower risk for developing amyloidosis than other breeds
- Cats—Abyssinian, Oriental shorthair, and Siamese

Mean Age and Range

- Most affected dogs and cats are older than 5 years of age
- Dogs—mean age at diagnosis is 9 years; range, 1–15 years
- Cats—mean age at diagnosis is 7 years; range, 1–17 years
- Prevalence increases with age



- Abyssinian cats—range, less than 1 year of age and up to 17 years of age
- Chinese shar-pei—usually less than 6 years of age when signs of kidney failure develop; range, 1.5–6 years of age
- Siamese cats with familial amyloidosis of the liver and thyroid gland usually develop signs of liver disease when 1–4 years of age

Predominant Sex

- Dogs and Abyssinian cats—females appear to be at a slightly higher risk than males to develop amyloidosis

SIGNS/OBSERVED CHANGES IN THE PET

- Depend on the organs affected, the amount of amyloid present in the tissues or organs, and the reaction of the affected tissues and organs to amyloid deposits
- Signs usually caused by kidney involvement; occasionally, liver involvement may cause signs in Chinese shar-pei dogs and Oriental shorthair and Siamese cats
- Lack of appetite (known as “anorexia”), sluggishness (lethargy), excessive urination (known as “polyuria”) and excessive thirst (known as “polydipsia”), weight loss, vomiting, and occasionally diarrhea
- Fluid buildup in the abdomen (known as “ascites”) and fluid buildup under the skin in the limbs and other parts of the body (known as “peripheral edema”) may be seen in pets with nephrotic syndrome (a medical condition in which the pet has protein in its urine, low levels of albumin [a type of protein] and high levels of cholesterol in its blood, and fluid accumulation in the abdomen, chest, and/or under the skin)
- Chinese shar-pei may have a history of previous episodic joint swelling and high fever that resolved spontaneously within a few days
- Young beagles with inflammation of many arteries (known as “juvenile polyarteritis”) may have a history of fever and neck pain that persisted for 3–7 days
- Oriental shorthair and Siamese cats may present with spontaneous bleeding in the liver, leading to acute collapse and accumulation of blood in the abdomen (known as “hemoabdomen”)
- Signs related to kidney failure—ulcers in the mouth, extreme weight loss (emaciation), vomiting, and dehydration; on physical examination, kidneys may be small, normal-sized, or slightly enlarged in affected dogs; they are usually small, firm, and irregular in affected cats
- Signs related to the primary inflammatory disease or cancer that caused the buildup of the amyloid protein in the tissues
- Up to 40% of affected dogs may develop blockage of blood vessels due to the presence of blood clots (known as “thromboembolic phenomena”); signs vary with the location of the blood clot (known as a “thrombus”); pets may develop difficulty breathing (known as “dyspnea”) if the clot forms in or moves into the lungs (known as “pulmonary thromboembolism”) or may develop weakness or paralysis of one or both hind limbs if the clot is located in the arteries going to the hind limbs (known as “iliac or femoral artery thromboembolism”)
- Chinese shar-pei dogs and Oriental shorthair and Siamese cats may have signs of liver disease (such as yellowish discoloration to the tissues [known as “jaundice” or “icterus”], wasting with extreme weight loss [known as “cachexia”], and spontaneous liver rupture and internal bleeding)

CAUSES

- Tumors or cancer and long-term (chronic) infectious and non-infectious inflammatory conditions can be found in 30% to 50% of dogs with reactive amyloidosis (in which amyloid protein production is induced by long-term [chronic] antigenic stimulation; an “antigen” is a substance that induces an immune response)
- Cancer (examples include lymphoma, plasmacytoma, multiple myeloma, mammary tumors, testicular tumors)
- Long-term (chronic) inflammation—systemic fungal infections (known as “mycoses,” such as blastomycosis, coccidioidomycosis); chronic bacterial infections (such as infections of the bone [known as “osteomyelitis”], of the bronchi and lungs [known as “bronchopneumonia”], inflammation of the lining of the chest [known as “pleuritis”], inflammation of the fat [known as “steatitis”], inflammation/infection of the uterus [known as “pyometra”], inflammation/infection of the kidney [known as “pyelonephritis”], chronic skin inflammation with pus present [known as “suppurative dermatitis”], chronic joint inflammation with pus present [known as “suppurative arthritis”], chronic inflammation of the lining of the abdomen [known as “peritonitis”], chronic inflammation of the mouth [known as “stomatitis”]); parasitic infections (such as heartworm disease [known as “dirofilariasis”], leishmaniasis, hepatozoonosis); and immune-mediated diseases (such as systemic lupus erythematosus)

- Familial (seen in Chinese shar-pei, English foxhound, and beagle dogs; Abyssinian, Siamese, and Oriental shorthair cats)
- Others—inherited disease in gray collies in which the dog has repeated episodes of low white blood cell counts and fever (known as “cyclic hematopoiesis”); disease in young beagles with inflammation of many arteries (juvenile polyarteritis)

RISK FACTORS

- Tumors or cancer or long-term (chronic) inflammation
- Family history in certain breeds

Treatment

HEALTH CARE

- Hospitalize pets with chronic kidney failure and dehydration for initial medical management
- Can manage stable pets and those that have protein in the urine, but no clinical signs (known as “asymptomatic proteinuria”) as outpatients
- Correct dehydration with 0.9% NaCl (sodium chloride) solution or lactated Ringer's solution; pets with severe metabolic acidosis (a condition in which levels of acid are increased in the blood) may benefit from bicarbonate supplementation
- Identify underlying tumors or cancer or inflammatory conditions and treat, if possible
- Manage kidney failure

ACTIVITY

- Normal

DIET

- Pets with chronic kidney failure—restrict phosphorus and moderately restrict protein
- Pets with high blood pressure (known as “hypertension”)—restrict sodium

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

- Medication to control blood pressure in pets with high blood pressure (hypertension)
- Pets with blood clots (thromboembolic syndrome) and nephrotic syndrome (a medical condition in which the pet has protein in its urine, low levels of albumin [a type of protein] and high levels of cholesterol in its blood, and fluid accumulation in the abdomen, chest, and/or under the skin) caused by accumulation of amyloid protein in the glomerulus of the kidney (known as “glomerular amyloidosis”) usually have a low plasma concentration of antithrombin III (a compound involved in clotting of the blood); low-dose aspirin has been suggested for dogs with glomerular disease to prevent platelet aggregation (treatment with aspirin should only be under the supervision of your pet's veterinarian)
- DMSO—may be helpful
- Methylsulfonylmethane (MSM) has been used in dogs with amyloidosis, but no evidence indicates that it benefits dogs with kidney amyloidosis
- Colchicine—prevents development of amyloidosis in people with familial Mediterranean fever (a familial amyloidosis) and stabilizes kidney function in pets with nephrotic syndrome, but without signs of kidney failure; no evidence of benefit once the pet develops kidney failure; may cause vomiting, diarrhea, and low white blood cell counts (known as “neutropenia”) in dogs; colchicine is used particularly in the Chinese shar-pei with episodic fever or multi-joint arthritis (polyarthritis) before development of kidney failure

Follow-Up Care

PATIENT MONITORING

- Monitor appetite and activity level daily; check body weight weekly
- Serum blood tests, especially albumin, creatinine, and blood urea nitrogen (BUN) concentrations, every 2 to 6

months in stable pets

- Can assess degree of protein being lost in the urine (proteinuria) by repeated urine protein: creatinine (UP/C) ratios

PREVENTIONS AND AVOIDANCE

- Do not breed affected pets

POSSIBLE COMPLICATIONS

- Kidney failure
- Nephrotic syndrome (a medical condition in which the pet has protein in its urine, low levels of albumin [a type of protein] and high levels of cholesterol in its blood, and fluid accumulation in the abdomen, chest, and/or under the skin)
- Systemic high blood pressure (hypertension)
- Liver rupture, causing bleeding into the abdomen
- Blood clots (thromboembolic disease)

EXPECTED COURSE AND PROGNOSIS

- Progressive disease that is usually advanced at the time of diagnosis; prognosis improves if an underlying tumor or cancer or immune-mediated disease or inflammatory disease is detected and treated successfully
- Survival for dogs with glomerular amyloidosis varied from 3 to 20 months in one study; some dogs occasionally may live longer
- Cats with kidney failure because of amyloidosis usually survive less than 1 year
- Mildly affected cats may not develop kidney failure and have an almost normal life expectancy

Key Points

- Progressive disease that is usually advanced at the time of diagnosis; prognosis improves if an underlying tumor or cancer or immune-mediated disease or inflammatory disease is detected and treated successfully
- Signs usually caused by kidney involvement; occasionally, liver involvement may cause signs in Chinese shar-pei dogs and Oriental shorthair and Siamese cats
- Familial predisposition in susceptible breeds; familial amyloidosis occurs in the following dog breeds: Chinese shar-pei, English foxhound, and beagle; and in the following cat breeds: Abyssinian, Oriental shorthair, and Siamese
- Potential for complications (such as high blood pressure and blood clots)

Notes

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