Ty Brown's

DOG HEALTH SECRETS:

WHAT YOUR VET DOESN'T TELL YOU THAT COULD SAVE YOUR DOG'S LIFE

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The domestic dog's health is possibly one of the best-studied areas in veterinary medicine, since the dog has had such a long and close relationship with humans. Infectious diseases are prevalent in dogs and are important not just from a veterinary standpoint but also because of the risk to public health. The most well known example of this is rabies. Genetic diseases are common in dogs due to the selective breeding necessary to produce individual dog breeds. Due to the popularity of both commercial and homemade dog foods, nutrition is also a heavily studied subject.

Diseases

Some diseases and other health problems are common to both humans and dogs; others are unique to dogs and other animals. Dogs are susceptible to various diseases; similarly to humans, they can have diabetes, epilepsy, cancer, or arthritis.

Infectious diseases

An infectious disease is caused by the presence of organisms such as viruses, bacteria, fungi, or parasites (either animalian or protozoan). Most of these diseases are spread directly from dog to dog, while others require a vector such as a tick or mosquito. Certain infectious diseases are a concern from a public health standpoint because they are zoonoses (transmittable to humans).

Viral diseases

Rabies

Rabies is a viral disease commonly associated with dogs, although in recent years canine rabies has been practically eliminated in North America and Europe due to extensive and often mandatory vaccination requirements. However it is still a significant problem in Africa, the Middle East, Latin America, and Asia.[1] Dogs are con-

sidered to be the main reservoir for rabies in developing countries. Areas that are rabies-free, (usually islands) such as Britain, Ireland, Australia, and the American state of Hawaii have strict quarantine laws to keep their territories rabies-free. These require long periods of isolation and observation of imported animals, which makes them unattractive places to move with a pet unless the pet is quite young. Areas that are not rabies-free usually require that dogs (and often cats) be vaccinated against rabies.

Historically, rabies has long been linked to dogs. The earliest mention of rabies is in the Codex of Eshnunna (ca. 1930 BC) (written prior to the Code of Hammurabi), which dictates that the owner of a dog showing symptoms of rabies should take preventative measure against bites. If a person was bitten by a rabid dog and later died, the owner was fined heavily. The sacred animal of the Babylonian goddess of health Gula or Ninisina was the dog; if a person insulted a dog, Gula caused that dog to bite the person and inflict them with rabies. In the 1800s the infectious nature of rabies was first demonstrated by taking the saliva from a rabid dog and injecting it into another animal.

Rabies in dogs is a fatal disease transmitted by the bite of an infected mammal, such as a cat, raccoon, bat, or another dog. Animals with rabies suffer deterioration of the brain and tend to behave bizarrely and often aggressively, increasing the chances that they will bite another animal or a person and transmit the disease. Three stages of rabies are recognized in dogs and other animals. The first stage is a one to three day period characterized by behavioral changes and is known as the prodromal stage. The second stage is the excitative stage, which lasts three to four days. It is this stage that is often known as furious rabies due to the tendency of the affected dog to be hyperreactive to external stimuli and bite at anything near. The third stage is the paralytic stage and is caused by damage to motor neurons. Incoordination is seen due to rear limb paralysis and drooling and difficulty swallowing is caused by paralysis of facial and throat muscles. Death is usually caused by respiratory arrest.

A person or dog bitten by an unknown dog (or other animal) should always be treated without waiting for symptoms, given the potentially fatal consequences of a rabid biter: there have been very few cases of someone surviving rabies when treatment was not begun until after symptoms appeared. Depending on local laws, dogs that are showing neurological signs at the time of the bite are euthanized in order to have their brain tested for rabies. Unvaccinated healthy dogs need to be confined for ten days from the time of the bite (at home or at a veterinarian depending on local law). If the dog is not showing signs of rabies at the end of ten days, then the bitten person could not have been exposed to rabies. Dogs and cats do not have the rabies virus in their saliva until a few days prior to showing symptoms.[6] Ten day confinement does not apply to other species. A dog or cat bitten by a wild animal in an area known to have rabies should be confined for six months, because it can take that long for symptoms to start. This is an incentive to dog-owners to vaccinate their dogs even if they feel the risk of their dog contracting rabies is low, since vaccination will eliminate the need for their dog to be euthanized or impounded should it bite anyone or be suspected of biting anyone.

Other viral diseases

Other canine viral diseases of note include parvovirus, distemper, infectious canine hepatitis, herpesvirus, and influenza.

Canine parvovirus (caused by canine parvovirus type 2, canine parvovirus type 1 is also known as canine minute virus) causes a highly contagious gastrointestinal infection that is especially severe in puppies. It is spread through contact with infected feces. The virus attacks rapidly dividing cells, notably those in the lymph nodes, intestinal crypts, and the bone marrow. There is depletion of lymphocytes in lymph nodes and necrosis and destruction of the intestinal crypts.[7] Symptoms and signs include vomiting, bloody diarrhea, depression, severe dehydration, fever, and low white blood cell counts. Although there is no specific treatment for the canine par-

vovirus, aggressive intravenous fluid therapy and antibiotics for dogs with secondary bacterial infections is usually required.[8]

Canine distemper, caused by a paramyxovirus similar to the cause of measles, is a highly contagious disease that affects the respiratory, gastrointestinal, and central nervous systems. It is spread through either direct contact with respiratory excretions, through the air, or on fomites (inanimate objects such as clothing). Symptoms and signs include discharge from the eye or nose, coughing, difficulty breathing, vomiting, diarrhea, depression, seizures, and paralysis. Similar to canine parvovirus, treatment is supportive.[9]

Infectious canine hepatitis is caused by canine adenovirus type 1. The virus is spread in the feces, urine, blood, saliva, and nasal discharge of infected dogs. It causes a liver infection and a bleeding disorder. Signs and symptoms include fever, depression, loss of appetite, coughing, tender abdomen, and spontaneous hemorrhages. Treatment is symptomatic.

Canine herpesvirus is a virus of the family Herpesviridae which most importantly causes a fatal hemorrhagic disease in puppies less than two to three weeks old. It is transmitted to puppies in the birth canal and by contact with infected oral and nasal secretions from the mother or other infected dogs, but it is not spread through the air. Signs and symptoms include depression, nasal discharge, and weakness. The inability of very young puppies to mount a febrile response seems to be a significant contributing factor to the high mortality rate in this age dog - it can reach 80 percent.[11] In adult dogs, canine herpesvirus can cause abortion.

Canine influenza usually refers to infection with equine influenza virus H3N8. This virus was found to infect dogs in 2004, and the disease was very contagious due to the dog's lack of natural immunity. Signs and symptoms include cough and nasal discharge, and in more severe cases fever and pneumonia. Canine influenza has a high morbidity but a low mortality.

Bacterial diseases
A number of Leptospira sp. bacteria atop a 0.1. Âµm polycarbonate filter

Bacterial diseases in dogs are usually not contagious from dog to dog; instead they are usually the result of wound colonization, opportunistic infections secondary to decreased resistance (often the result of viral infections), or secondary to other conditions (pyoderma secondary to skin allergies or pyometra secondary to cystic endometrial hyperplasia). These examples are not considered infectious diseases because they do not satisfy Koch's postulates - for example Staphylococcus intermedius, a commonly isolated bacteria from skin infections in dogs, would not cause pyoderma when introduced to a healthy dog. In all likelihood that type of bacteria is already present on the skin of a healthy dog.

There are some bacteria that are contagious from dog to dog. The most notable of these are Bordetella bronchiseptica, one of the causes of kennel cough, Leptospira sp, which cause leptospirosis, and Brucella canis, cause of brucellosis in dogs. There are also common tick-borne bacterial diseases, including Lyme disease, ehrlichiosis, and Rocky Mountain spotted fever.

Leptospirosis is a zoonotic disease caused by bacteria of the genus Leptospira. Humans and dogs become infected through contact with water, food, or soil containing urine from infected animals. This may happen by swallowing contaminated food or water or through skin contact, especially with mucosal surfaces, such as the eyes or nose, or with broken skin. In dogs, transmission most commonly occurs by drinking puddle, pond, or ditch water contaminated by urine from infected wildlife such as squirrels or raccoons. The liver and kidney are most commonly damaged by leptospirosis. Vasculitis can occur, causing edema and potentially disseminated intravascular coagulation (DIC). Myocarditis, pericarditis, meningitis, and uveitis are also possible sequelae.

Brucellosis in dogs is caused by Brucella canis. It is a sexually transmitted disease, but can also be spread through contact with aborted fetuses. The most common sign is abortion during the last trimester or stillbirth. Other symptoms include inflammation of the intervertebral disc and eye (uveitis), and inflammation of the testicle (orchitis) and prostate (prostatitis) in males.[14]

Tick-borne diseases are common in dogs. Lyme disease, or borreliosis, is caused by Borrelia burgdorferi and spread by Ixodes pacificus on the West coast of the United States and by I. scapularis (deer tick) in the rest of the U.S. Signs and symptoms include fever, joint swelling and pain, lameness, and swelling of the lymph nodes. It has been diagnosed in dogs in all 48 states of the continental U.S.[15] Ehrlichia canis, which causes canine ehrlichiosis, and Rickettsia rickettsii, which causes Rocky Mountain spotted fever, are both spread by the American dog tick, Dermacentor variabilis, and the brown dog tick, Rhipicephalus sanguineous.[16]

Fungal diseases

One of the most common fungal diseases in dogs is ringworm, or dermatophytosis, an infection of the skin, hair, or nails. There are three fungal species that cause ringworm in dogs. About 70 percent of infections are caused by Microsporum canis, 20 percent by M. gypseum, and 10 percent by Trichophyton mentagrophytes. Signs include hair loss and scaling of the skin. Treatment for localized ringworm is not always necessary as the disease is self-limiting, but the cliinical course can be shortened by using topical miconazole or clotrimazole. Generalized infections, most commonly seen in immunocompromised dogs, can be treated with oral antifungal drugs such as griseofulvin or itraconazole. Infection can spread to humans.[17] Blastomyces dermatitidis

There are several fungal diseases that are systemic in nature, meaning they are affecting multiple body systems. Blastomycosis, caused by Blastomyces dermatitidis, is a fungal disease that affects both dogs and humans, although it is only rarely zoonotic. It is

found mainly in the United States in the Mississippi River and Great Lakes areas. Signs include weight loss, cough, fever, enlarged lymph nodes, draining skin lesions, blindness, and lameness. Because dogs are ten times more likely to become infected from the environment than humans, they are considered to be sentinels for the disease.

Histoplasmosis, caused by Histoplasma capsulatum, is a disease with a worldwide distribution. In the United States it is mainly found in the Mississippi and Ohio River areas, most commonly in bird and bat feces. Signs include weight loss, cough, fever, enlarged lymph nodes, and gastrointestinal symptoms.[19] Coccidioidomycosis, caused by Coccidioides immitis, is found in arid and semi-arid regions of Central and South America, Mexico, and southwestern United States. Signs include weight loss, fever, cough, enlarged lymph nodes, and lameness.

Parasites

External parasites

* Fleas and ticks of various species can be acquired and brought home by a dog, where they can multiply and attack humans (and vice versa). This is particularly important, now that tick-borne Lyme Disease has become endemic throughout a large area, in addition to other similar diseases such as Rocky Mountain Spotted Fever. Although dogs do not seem to be as susceptible to such diseases as humans, similar rickettsial diseases have been spread by dogs to humans through such mechanisms as a dog killing an infected rabbit, then shaking itself off in the house near enough to its owners to fatally infect most of the family.

* Fleas and ticks are common parasites for which there are many effective preventive measures.

* Various mites cause skin problems such as mange.

Internal parasites

* Parasites, particularly intestinal worms such as hookworms, tapeworms and roundworms, can be transmitted in a dog's feces. Some tapeworms have fleas as intermediate hosts: the worm egg must be consumed by a flea to hatch, then the infected flea must be ingested (usually by the dog while grooming itself, but occasionally by a human through various means) for the adult worm to establish itself in the intestines. The worm's eggs then pass through the intestines and adhere to the nether regions of the dog, and the cycle begins again.

* Intestinal worms cause varying degrees of discomfort.

* Heartworm is a dog parasitoid. It is hard to eliminate and can be fatal; prevention, however, is easily achieved using medication.

As the name suggests, an infected mosquito injects a larva into the dog's skin, where it migrates to the circulatory system and takes up residence in the pulmonary arteries and heart, growing and reproducing to an alarming degree. The effects on the dog are quite predictable, cardiac failure over a year or two, leading to death. Treatment of an infected dog is difficult, involving an attempt to poison the healthy worm with arsenic compounds without killing the weakened dog, and frequently does not succeed. Prevention is much the better course, via heartworm pills which are fed to the dog and contain a compound which kills the larvae immediately upon infection without harming the dog. Often they are available combined with other parasite preventives.

* Hydatidosis is caused by a cestode Echinococcus. This is usually noticed among dogs, wild dogs, foxes, etc. Due to its importance as a zoonosis, these worms are important to treat. Preventing hydatidosis is an easier task than treating the same. Anthelmintics such as praziquantel may help prevent this condition. Prohibition of the feeding of dogs with uncooked offals may be the best prophylactic measure against these tapeworms.

Genetic diseases

Genetic conditions are a problem in some dogs, particularly pure-breeds. For this reason many of the national kennel clubs require that dogs with certain genetic illnesses or who are deemed to be carriers cannot be registered. Some of the most common conditions include hip dysplasia, seen in large breed dogs, von Willebrand disease, a disease that affects platelets that is inherited in Doberman Pinschers, entropion, a curling in of the eyelid seen in Shar Peis and many other breeds, progressive retinal atrophy, inherited in many breeds, deafness, and epilepsy, known to be inherited in Belgian Shepherd Dogs, German Shepherd Dogs, Cocker Spaniels, and St. Bernards.

Subaortic stenosis, or SAS, is a genetic ailment that causes a narrowing of the passage of blood between the heart and the aorta. This leads to heart problems and sometimes sudden death. It affects larger breeds such as the Newfoundland Dog and the Golden Retriever. In some dogs, such as collies, the blue merle or harlequin coloring is actually the heterozygote of a partially recessive gene preventing proper development of the nervous system; therefore, if two such dogs are mated, on the average one quarter of the puppies will have severe genetic defects in their nervous systems and sensory organs ranging from deafness to fatal flaws.

Skin diseases

Skin diseases are very common in dogs. Atopy, a chronic allergic condition, is thought to affect up to 10 percent of dogs.[23] Other skin diseases related to allergies include hot spots and pyoderma, both characterized by secondary bacterial infections, food allergy, ear infections, and flea allergy dermatitis. Canine follicular dysplasia is an inherited disorder of the hair follicles resulting in alopecia (baldness). Mange is an infectious skin disease caused by mites. Endocrine diseases such as hypothyroidism and Cushing's syndrome can also manifest as skin problems like alopecia or recurring bacte-

rial infections. Another class of integumentary malady is hygromas, a swelling typically on or near the elbow joint.

Orthopedic diseases

Orthopedic diseases in dogs can be developmental, hereditary, traumatic, or degenerative. Because of the active nature of dogs, injuries happen frequently. One of the most common of these is an anterior cruciate ligament injury, a condition which often requires surgery. Bone fractures are a frequent occurrence in outdoor dogs due to trauma from being hit by cars. Degenerative joint disease is common in older dogs and is one of the most likely reasons for prescription of non-steroidal anti-inflammatory drugs.

Hereditary orthopedic diseases are mainly found in purebred dogs. Hip dysplasia is a common problem that primarily affects larger breeds. Hip dysplasia is a defect in the shape of the hip joint which can, depending on the degree of hip luxation, be quite painful to the dog as it ages. Over time it often causes arthritis in the hips. Dysplasia can also occur in the elbow joint. Luxating patellas can be a problem for smaller breeds. It can cause lameness and pain in the hind legs.

Developmental orthopedic diseases include panosteitis and hypertrophic osteodystrophy. Panosteitis occurs in large and giant breed dogs usually between the age of five and fourteen months and manifests as fever, pain, and shifting leg lameness. Hypertrophic osteodystrophy is also seen in young large and giant breed dogs and is characterized by pain, lameness, fever, and swelling of the long bone metaphysis.

Tumors and Cancer

Both benign and malignant tumors are seen in dogs. Common benign tumors include lipomas, non-viral papillomas, sebaceous gland adenoma, and perianal gland adenomas.

Frequently seen cancers include lymphoma, melanoma, mast cell tumors (which are considered to be potentially malignant, even though they may have benign behavior), and osteosarcoma (bone cancer).

Certain breeds are more likely to develop particular tumors, larger ones especially. The Golden Retriever is especially susceptible to lymphoma, with a lifetime risk of 1 in 8. Boxers and Pugs are prone to multiple mast cell tumors. Scottish Terriers have eighteen times the risk of mixed breed dogs to develop transitional cell carcinoma, a type of urinary bladder cancer.

Gastrointestinal diseases

Due to the indiscriminate nature of a dog's appetite, gastrointestinal upset is a frequent occurrence in dogs. The most common symptoms are anorexia, vomiting, and diarrhea. Foreign body ingestion can lead to acute obstruction of the gastrointestinal tract, a very dangerous condition. Acute pancreatitis can also result from dietary indiscretion.

Breeds with deep, narrow chests, such as the Great Dane or St. Bernard, are susceptible to a syndrome of gastric torsion and bloat. The stomach twists on its supporting ligaments, sealing off the exits, and the contents begin to generate gas pressure which is very painful and rapidly causes shock and necrosis of large areas of stomach tissue. It can be fatal within a few hours. Dogs who have experienced bloat are very susceptible to recurrences. Treatment involves stabilization and abdominal surgery to tack the dog's stomach down to prevent recurrence (gastropexy).

Eye diseases

Eye diseases are common in dogs. Cataracts, glaucoma, and entropion are seen in both dogs and humans. Canine-specific eye dis-

eases include progressive retinal atrophy, Collie eye anomaly, sudden acquired retinal degeneration, and cherry eye. Injury to the eye can result in corneal ulcers.

The frequency of bilateral glaucoma with a genetic base in purebred dogs is higher than in any species except humans.[27] Cataracts in dogs either have a genetic base or can also be caused by diabetes. Nuclear sclerosis resembles a cataract but is actually a normal age-related change.

Vestibular disease

Elderly dogs are susceptible to an unusual form of intense vertigo, known as old dog vestibular disease, the cause of which is unknown, or idiopathic. Signs include nausea, difficulty or the complete inability to stand, head tilt, circling, and nystagmus (the movement of the eyes in a repetitive jerking motion, usually horizontal). The signs may improve rapidly or take a few days. While most cases are idiopathic, vestibular signs can also be caused by inner ear disease, a brain tumor, or rarely a stroke. The major risk of idiopathic cases is that the dog is often unable to eat, drink, or go outside to urinate or defecate. These cases must receive supportive therapy of intravenous fluids and nutrition; a light sedative is sometimes administered, as the dog may be very stressed by the experience.

Heart disease

Older, small breeds of dogs are prone to congestive heart failure due to degeneration of the mitral valve. This condition is known to be inherited in Cavalier King Charles Spaniels. Degenerative valve disease is the most common form of heart disease in dogs.[28] Mitral insufficiency leads to turbulent blood flow and increased pressure in the left atrium. This causes increased pressure in the pulmonary blood vessels and pulmonary edema (a build-up of fluid in the lungs). Decreased output of blood by the left ventricle causes

the body to compensate by increasing sympathetic tone and activating the renin-angiotensin-aldosterone system (RAAS). Increased sympathetic tone leads to increased peripheral vascular resistance and increased heart rate and contractility of the heart muscle. Chronic elevation of sympathetic tone damages the heart muscle. Activation of the RAAS results in increased retention of water and sodium by the kidneys, vasoconstriction, and other effects that result in increased blood volume. It also results in an increase in diastolic pressure and leads to pulmonary edema. Treatment for congestive heart failure has historically focussed on two types of drugs that address these concerns: diuretics (especially furosemide), which decrease blood volume, and ACE inhibitors, which interrupt the RAAS. Recently, pimobendan - which increases the force with which the heart muscle contracts, and is also a vasodilator - is being more widely used in the treatment of congestive heart failure caused by valvular disease. A major veterinary study published in September 2008 found that dogs with congestive heart failure receiving pimobendan plus furosemide had significantly better survival outcomes than those receiving benazepril (an ACE inhibitor) plus furosemide.

Cardiomyopathy, or disease of the heart muscle, is also seen in dogs and is associated with large breeds (the exception being Cocker Spaniels, a medium-sized breed). Dilated cardiomyopathy is seen in Great Danes, Irish Wolfhounds, St. Bernards, Dobermanns, Boxers, and other large breeds. Dobermanns, in addition to heart muscle failure, are prone to ventricular arrhythmias. Boxers often present with weakness and fainting due solely to arrhythmias - there is no heart muscle failure at the time of diagnosis. They do, however, eventually develop congestive heart failure, if they do not die suddenly due to an arrhythmia.

Other diseases

Other diseases affecting dogs include endocrine diseases, immune-mediated diseases, and reproductive diseases. Diabetes mellitus, Cushing's syndrome, Addison's disease, and hypothyroidism are the

most common endocrine diseases. Immune-mediated hemolytic anemia is a devastating disease that causes severe anemia in dogs through destruction by the immune system. It has been associated with vaccinations and certain drugs, although many cases are idiopathic. A similar but less severe immune disease is immune-mediated thrombocytopenia, characterized by destruction of platelets by the immune system. Symptoms include bruising and petechiae (pinpoint bruising, often seen in the mouth). Common reproductive diseases include pyometra (distension of the uterus with pus), mammary tumors, and benign prostatic hyperplasia.

Dangerous foods

Some foods commonly enjoyed by humans are dangerous to dogs:

* Dogs love the flavor of chocolate, but chocolate in sufficient doses is lethally toxic to dogs (and horses and possibly cats). Chocolate contains theobromine, a chemical stimulant that, together with caffeine and theophylline, belongs to the group of methylxanthine alkaloids. Dogs are unable to metabolize theobromine effectively. If they eat chocolate, the theobromine can remain in their bloodstreams for up to 20 hours, and these animals may experience fast heart rate, hallucinations, severe diarrhea, epileptic seizures, heart attacks, internal bleeding, and eventually death. A chocolate bar can be sufficient to make a small dog extremely ill or even kill it. Approximately thirty grams of baking chocolate per kilogram (1/2 ounce per pound) of body weight is enough to be poisonous. In case of accidental intake of chocolate by especially a smaller dog, contact a veterinarian or animal poison control immediately; it is commonly recommended to induce vomiting within two hours of ingestion. Large breeds are less susceptible to chocolate poisoning, but still are far less tolerant of the substance than humans are.

Note:Carob treats are often available as dog treats; these are unrelated to chocolate and are safe.

* It has recently been confirmed that grapes and raisins can cause acute kidney failure in dogs (see also grape and raisin toxicity in dogs). The exact mechanism is not known, nor is there any means to determine the susceptibility of an individual dog. While as little as one raisin can be toxic to a susceptible ten pound dog, some other dogs have eaten as much as a pound of grapes or raisins at a time without ill effects. The affected dog usually vomits a few hours after consumption and begins showing signs of renal failure three to five days later.

* Onions, and to a significantly lesser extent garlic, contain thiosulfate which causes hemolytic anemia in dogs (and cats). Thiosulfate levels are not affected by cooking or processing. Small puppies have died of hemolytic anemia after being fed baby food containing onion powder. Occasional exposure to small amounts is usually not a problem, but continuous exposure to even small amounts can be a serious threat. Garlic is also known to cause diarrhea and vomiting.

* Macadamia nuts can cause stiffness, tremors, hyperthermia, and abdominal pain. The exact mechanism is not known. Most dogs recover with supportive care when the source of exposure is removed.

* Alcoholic beverages pose much the same temptation and hazard to dogs as to humans. A drunk dog displays behavior analogous to that of an intoxicated person. (However, beer presents another problem; see below.)

* Hops, a plant used in making beer, can cause malignant hyperthermia in dogs, usually with fatal results. Certain breeds, such as Greyhounds, seem particularly sensitive to hop toxicity, but hops should be kept away from all dogs. Even small amounts of hops can trigger a potentially deadly reaction, even if the hops are "spent" after use in brewing.

* Xylitol is a sugar substitute used in chewing gum, chewable vitamins, candy, toothpaste, and other products. Although empirical

studies (1, 2, 3) indicate xylitol may be safe for dogs, there have been cases of foods, candies and gums containing xylitol causing toxic or even fatal liver damage in dogs and should be avoided (1, 2, 3).

* Some dogs have food allergies just as humans do; this is particular to the individual dog and not characteristic of the species as a whole. An example is a dog becoming physically ill from salmon; many humans likewise have seafood allergies.

* If dogs eat the pits of fruits such as peaches and apricots, they can get cyanide poisoning due to cyanogenic glycosides.

Common household substances

Some common household chemicals are particularly dangerous to dogs:

* Antifreeze, due to its sweet taste, poses an extreme danger of poisoning to a dog (or cat) that either drinks from a spill or licks it off its fur. The antifreeze itself is not toxic, but is metabolized in the liver to a compound which causes kidney failure, and eventual seizures, and death. By the time symptoms are observed, the kidneys are usually too damaged for the dog to survive so acting quickly is important. Immediate treatment is to administer apomorphine or peroxide solution in an effort to get the animal to vomit up as much of the antifreeze as possible. Next, it is critical to immediately get the animal to a veterinarian. Fomepizole (Antizol Vet by Orphan Medical) is considered the preferred treatment for treating ethylene glycol toxicoses in dogs. Ethanol can also be used in cats and dogs, however it does have several unfavorable side effects. Ethanol occupies the enzymes in the dog's liver, long enough for the unmetabolized antifreeze to be passed out harmlessly through the kidneys. Dogs should not be allowed access to any place in which an antifreeze leak or spill has happened until the spill is completely cleaned out. Even a very small amount such as a tablespoon can easily prove fatal. Some brands of antifreeze that contain propylene

glycol instead of ethylene glycol are marketed as being less harmful or less attractive to animals.

* Mouse and rat poison is commonly found in the house or garage. Dogs readily eat these poisons, which look like small green blocks and are very attractive to them. The poisons work by depleting stores of Vitamin K in the body, without which blood can not clot properly. Symptoms of poisoning include depression, weakness, difficulty breathing, bruising, and bleeding from any part of the body. These symptoms often take 3 to 4 days to show up. A blood test will show that the blood is not clotting properly. If the poison has only recently been ingested (within 2 to 3 hours), the dog should be given apomorphine or hydrogen peroxide to make it vomit. Activated charcoal can be given to absorb any remaining poison in the gastrointestinal tract. Then the dog is given Vitamin K supplementation for 3 to 4 weeks, depending on the type of poison. At the end of treatment, the clotting times should be tested again. The prognosis is good in these cases. However, if the dog is already showing signs of poisoning, it is too late to try and remove the poison from the body. A whole blood transfusion or plasma is given to treat the anemia and to try and control bleeding. Vitamin K is also given. The prognosis is poor in these cases.

o Mouse and rat poisons containing cholecalciferol cause hypercalcemia and hyperphosphatemia in dogs. Symptoms include depression, loss of appetite, vomiting blood, weakness, and shock. Treatment is as above for recent exposure. When hypercalcemia occurs (which can take 1 to 2 weeks), treatment is with intravenous fluids (saline), diuretics, corticosteroids, and calcitonin. Long term prognosis is good once the dog is stabilized.

* Zinc toxicity, mostly in the form of the ingestion of US pennies minted after 1982, is commonly fatal in dogs where it causes a severe hemolytic anemia.

Over the counter medications

A veterinarian should be checked before any OTC medicine is used. However, poisoning with pain medications is common. Aspirin, acetaminophen (Tylenol), ibuprofen (Advil), and naproxen (Aleve) can all cause severe symptoms in dogs, including vomiting blood, diarrhea, and abdominal pain. Specifically, aspirin can cause metabolic acidosis, acetaminophen can cause liver disease, ibuprofen can cause kidney disease, and naproxen can cause ulcers in the stomach, which can perforate. Treatment depends on the symptoms.

Contact your veterinarian or the ASPCA Animal Poison Control Center in case of possible exposure.

Public health risks

Most diseases that affect dogs or humans are not transferable between the two species. There are some exceptions of zoonoses. The most well known zoonosis is rabies, a viral infection transmitted through a bite. A common bacterial zoonosis is leptospirosis, transmitted through urine. Some of the most important zoonoses are parasitic. Zoonotic intestinal parasites transmitted through contact with feces include Toxocara canis (the canine roundworm), which causes toxocariasis, visceral larva migrans, and ocular larva migrans, and hookworms, which can cause cutaneous larva migrans. Zoonotic skin parasites include scabies, caused by the mite Sarcoptes scabiei. The most common zoonotic fungal disease is ringworm, caused in this case by Microsporum canis.

Preventive medicine

Depending on the location of the dog, highly recommended vaccines include rabies, canine parvovirus, canine distemper, and infectious canine hepatitis (using canine adenovirus type 2 to avoid reaction). Vaccination for other diseases, including leptospirosis, Lyme disease, Bordetella bronchiseptica, parainfluenza virus, and canine coronavirus, are used after determining the risk of contact with these pathogens.

Dentistry

Dental disease is one of the most common diseases in dogs. Accumulation of plaque and subsequently tartar leads to gingivitis and then periodontitis (gum disease). Periodontitis leads to loss of the bony attachment of the teeth and tooth loss. Preventive measures include tooth brushing and dental scaling and polishing. Cavities are uncommon in dogs.

Nutrition and obesity

Human food such as ice cream can lead to ill health and obesity in dogs.

Feeding table scraps to a dog is generally not recommended, at least in excess. Dogs get ample correct nutrition from their natural, normal diet. Otherwise, just as in humans, their diet must consist of the appropriate mix of nutrients, carbohydrates, and proteins, with the appropriate mix to provide all of the minerals and vitamins that they need. A human diet is not ideal for a dog: the concept of a "balanced" diet for a facultative carnivore like a dog is not the same as in an omnivorous human. Wild and feral dogs can usually get all the nutrients needed from a diet of whole prey and raw meat. In addition, the scraps often consist of fat rather than meat protein, which in excess is no better for dogs than it is for humans. While not all human delicacies are acutely toxic to dogs (see above), many have the same chronically unfortunate results as they do for humans. Lastly, many people overfeed their dogs by giving them table scraps and human food such as ice cream. Dogs will usually eat all the scraps and treats they are fed, which is more than often too much food..

The result of too much food is obesity, an increasingly common problem in dogs in Western countries, which can cause numerous health problems just as it does in humans, although dogs are much

less susceptible to the common cardiac and arterial consequences of obesity than humans are. According to a study published in the Journal of Veterinary Internal Medicine, the prevalence of obesity in dogs is between 22 and 40 percent.

Additionally, the feeding of table scraps directly from the table (as opposed to taking scraps after the meal, and giving them in the dog's food dish as a treat) can lead to trained begging behavior on the part of the dog, or even encourage the dog to reach up and take food directly from the table (another trained response). These are normally seen as undesirable behavioral traits in a dog.

Obesity can be a sign of other serious ailments such as Cushing's Disease which is characterized by weight gain, appetite increase and lethargy in primarily older dogs.

A modern trend in canine diets is raw feeding of whole meats, bones and little filler material.

Coprophagia

Many dogs have a fondness for eating feces. Some consume their own or other dogs' feces; others seem to prefer cat feces (which, due to the feline digestive system, are high in protein and consumed by many animals in the wild), and will raid a kitty litter box for "treats". This can be unsafe for the dog's health if the animal producing the feces has any diseases or parasites or has recently ingested drugs that might be poisonous.

Reproductive health

Spaying (females only) and neutering (both genders but more usually males) refers to the sterilization of animals, usually by removal of the male's testicles or the female's ovaries and uterus, in order to eliminate the ability to procreate, and reduce sex drive. Neutering

has also been known to reduce aggression in male dogs, but has been shown to occasionally increase aggression in female dogs.

Animal control agencies in the United States and the ASPCA advise that dogs not intended for further breeding should be spayed or neutered so that they do not have undesired puppies.

Because of the overpopulation of dogs in some countries, puppies born to strays or as the result of accidental breedings often end up being killed in animal shelters. Spaying and neutering can also decrease the risk of hormone-driven diseases such as mammary cancer, as well as undesired hormone-driven behaviors. However, certain medical problems are more likely after neutering, such as urinary incontinence in females and prostate cancer in males. The hormonal changes involved with sterilization are likely to somewhat change the animal's personality, however, and some object to spaying and neutering as the sterilization could be carried out without the excision of organs.

It is not essential for a female dog to either experience a heat cycle or have puppies before spaying, and likewise, a male dog does not need the experience of mating before neutering.

Female cats and dogs are seven times more likely to develop mammary tumors if they are not spayed before their first heat cycle. The high dietary estrogen content of the average commercial pet food as well as the estrogenic activity of topical pesticides[citation needed] may be contributing factors in the development of mammary cancer, especially when these exogenous sources are added to those normal estrogens produced by the body. Dog food containing soybeans or soybean fractions have been found to contain phytoestrogens in levels that could have biological effects when ingested longterm.

Tobacco smoke

Dogs are affected by passive smoking.

Vaccinations

Programs supporting regular vaccination of dogs have contributed both to the health of dogs and to the public health. In countries where routine rabies vaccination of dogs is practiced, rabies in humans is reduced to a very rare event.

Currently, there are geographically defined core vaccines and individually chosen non-core vaccine recommendations for dogs.

Most vaccination protocols recommend a series of vaccines for puppies, with vaccine boosters given at one year of age. Frequency of vaccination thereafter varies with the disease and vaccine type.

Most vaccines are given by subcutaneous (under the skin) or intramuscular (into the muscle) injection. Respiratory tract disease vaccination may be given intra-nasally (in the nose) in some cases.

Vaccine immunogens may consist of killed or inactivated pathogens, bio-engineered pathogen proteins or polypeptides, or, increasingly rarely, modifed-live virus. Most vaccines contain adjuvants designed to boost the immune response to the vaccines. Many adverse reactions are associated with reactions to these adjuvants.
Contents

Core vaccines for dogs

Government laws and local recommendations vary, but in countries where rabies occurs naturally and laws address licensing and vaccination of dogs, rabies vaccination of dogs is required by law.

Other core vaccines in most regions include canine distemper, canine parvovirus, canine hepatitis virus or adenovirus-2.

Non-core vaccines for dogs

Non-core vaccines for dogs, which may be important to administer when exposure is predicted, include Bordatella (kennel cough), canine parainfluenza virus (another kennel cough agent), and Lyme disease. Generally not recommended owing to unproven efficacy are canine coronavirus, canine adenovirus-1 (which also causes significant reaction), Giardia vaccine and rattlesnake envenomation vaccine. The rattlesnake vaccine available from Red Rock Biologics is given to dogs in two doses with yearly boosters recommended for best results. It is marketed as a safer and more economical alternative to antivenom treatment but does not negate the need for immediate medical treatment for such a bite. Vaccines for other species of poisonous snakes are being developed by Red Rock [1].

Controversies in dog vaccination

There are evolving theories about the necessity and frequency of vaccinations for domestic dogs. Many dog owners and now many academic veterinarians have expressed concern that dogs are being vaccinated too frequently. Specific adverse reactions and general consequences for long-term health are both being cited as reasons to reduce the frequency of vaccination of adult dogs. Manufacturers of vaccines for dogs have responded by developing more vaccines with at least three year efficacy proven. Many states and communities have changed ordinances to allow for longer intervals between rabies vaccinations when vaccines of proven efficacy are administered.

Adverse reactions to vaccines

Adverse reactions usually occur because of a harmful immune-mediated reaction to either the vaccine immunogen itself or to the vaccine adjuvant. Rarely, modified live virus vaccine agents cause disease directly.

Ischemic Dermatopathy / Cutaneous vasculitis

A little known and often misdiagnosed reaction to the rabies vaccine in dogs, this problem may develop near or over the vaccine administration site and around the vaccine material that was injected, or as a more widespread reaction. Symptoms include ulcers, scabs, darkening of the skin, lumps at the vaccine site, and scarring with loss of hair. In addition to the vaccination site, lesions most often develop on the ear flaps (pinnae), on the elbows and hocks, in the center of the footpads and on the face. Scarring may be permanent. Dogs do not usually seem ill, but may develop fever. Symptoms may show up within weeks of vaccination, or may take months to develop noticeably.

Dogs with active lesion development and / or widespread disease may be treated with pentoxyfylline, a drug that is useful in small vessel vasculitis, or tacrolimus, an ointment that will help suppress the inflammation in the affected areas.

Owners and veterinarians of dogs who have developed this type of reaction should review the vaccination protocol critically and try to reduce future vaccinations to the extent medically and legally possible. At the very least, vaccines from the same manufacturer should be avoided. It is also recommended that the location in which future vaccinations are administered should be changed to the rear leg, as far down on the leg as possible and should be given in the muscle rather than under the skin.

Urticaria / Anaphylaxis

Fortunately, severe systemic reaction to vaccine allergy is very rare in dogs. When it does occur, however, anaphylaxis is a life-threatening emergency. More often, dogs will develop urticaria, or hives within minutes of receiving a vaccine. When this occurs, a veterinarian will treat the reaction with antihistamines and corticosteroid drugs and this is usually effective. Future vaccine protocols must be modified according to the vaccine component suspected to have triggered the reaction.

External Resources

* 2006 AAHA Canine Vaccine Guidelines
* AVMA Principles of Vaccination
* The Vexing Vaccine Issue from JAVMA News
* UC Davis VMTH Canine and Feline Vaccination Guidelines
* Vaccine FAQ from The Pet Health Library
* Baughan, Loretta. Are We Over Vaccinating Our Pets? Spaniel Journal
* GUIDELINES FOR THE VACCINATION OF DOGS AND CATS. COMPILED BY THE VACCINATION GUIDELINES GROUP (VGG)OF THE WORLD SMALL ANIMAL VETERINARY ASSOCIATION WSAVA)
* 2006 AAHA Canine Vaccine Guidelines