Anaphylaxis

By Jordan Fetto, DVM

angell.org/emergency

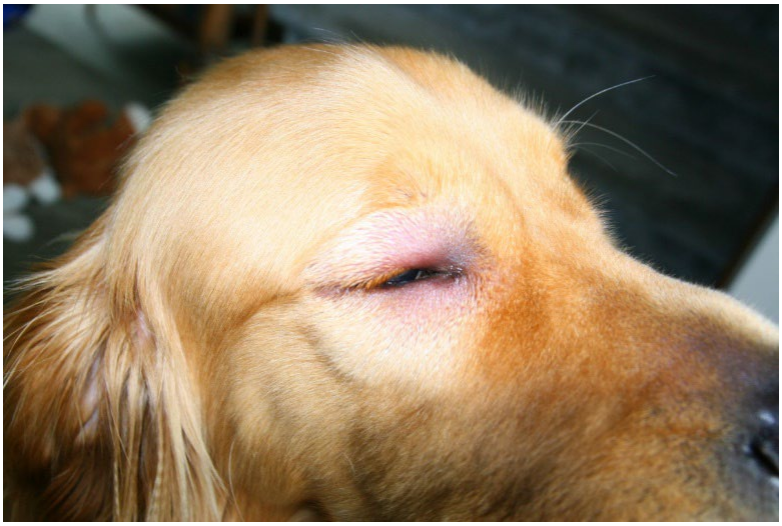
emergency@angell.org

781-902-8400

July 2023

What is anaphylaxis?

Allergic reaction is an acute, LOCAL hypersensitivity reaction in which the skin becomes red (erythema), itchy (pruritus), swollen (angioedema), and/or develops hives (urticaria).



Anaphylaxis is an exaggerated allergic reaction resulting in potentially life-threatening SYSTEMIC consequences such as gastrointestinal, cardiovascular, respiratory, and/or nervous system dysfunction, which may lead to organ failure and death.

What is an antigen?

An antigen, such as snake venom or chicken protein in food, is a foreign substance that the immune system recognizes when introduced to the body as foreign. This results in activation of the immune system to mount a defense and protect the body from the antigen. An allergen is an antigen that results in an allergic reaction or anaphylaxis.

What causes an anaphylactic reaction?

Both allergic reactions and anaphylaxis are caused by exposure to an antigen (allergen). Allergens are found in food, insect bites/stings, reptile venom, blood-based products, vaccines, pollen, and chemicals. When talking about our pets, the most common allergen is a food protein such as chicken or an encounter with an insect such as a bee sting or spider bite. For an allergic reaction to take place, the body has to be exposed to the allergen previously. This previous exposure sensitizes the immune system, and there are no observable symptoms or signs that it occurred. Once the immune system is primed, the next time the allergen is encountered, the immune system will immediately recognize it as foreign and mount a response to neutralize it.

What are the symptoms of anaphylaxis?

Unlike an allergic reaction, symptoms of anaphylaxis are not limited to the skin. The symptoms that predominate in anaphylaxis depend on the organ with the highest population of mast cells, which is species-dependent. These organs are known as "shock organs." The dog's shock organ is the gastrointestinal tract and liver. Thus, dogs will develop vomiting, diarrhea with or without blood, elevated liver enzymes, extreme lethargy, collapse, and pale-colored gums. The lungs are the shock organ of cats, so signs of respiratory distress are observed during episodes of anaphylaxis. Such symptoms include open mouth breathing, panting, stretched necks, exaggerated abdominal effort, and/or cyanotic gum color. These symptoms are due to bronchoconstriction, upper airway obstruction caused by laryngeal edema, and airway congestion caused by increased mucous production.

How is anaphylaxis diagnosed?

The clinical history obtained by the veterinarian will provide the biggest indication that your pet is experiencing anaphylaxis. The veterinarian will ask questions to determine if your pet has known allergies and hypersensitivity reactions in the past, recently spent time outdoors, if you witnessed an exposure to or encounter with an allergen (i.e., observed ingestion of a known food allergen or witnessed a bee sting), and the time between exposure and onset of symptoms. Many diseases can cause similar symptoms, so a thorough history is important. Additionally, physical exam findings and changes in bloodwork and ultrasound can increase the clinical suspicion of anaphylaxis. There is no specific test for anaphylaxis, so it is diagnosed based on high clinical suspicion after compiling all of the information from the history, physical exam, and diagnostics.

How is anaphylaxis treated?

Treatment of anaphylaxis requires hospitalization at a 24-hour facility for aggressive medical management and close monitoring to ensure a biphasic reaction does not occur up to 72 hours later. The mainstay of treatment is the administration of IV fluids and epinephrine. IV fluids correct low blood pressure and restore perfusion. Epinephrine prevents further stimulation of mast cells, opens the airways (bronchodilator), and improves blood pressure. Other treatments include antihistamines, antacids, anti-nausea medications, supplemental oxygen, and steroids. Sometimes antibiotics and blood products such as fresh frozen plasma are needed based on the severity of the reaction.

What is the prognosis?

For allergic reactions and mild cases of anaphylaxis, the prognosis is excellent. Severe cases of anaphylaxis have a guarded prognosis, but prompt recognition and initiation of aggressive medical treatment improve prognosis. Typically the first several hours are the most critical, but once a patient is stabilized, they can often be discharged from the hospital in one to three days. Overall the survival rate for anaphylaxis is 85%.

References

1. Shmuel DL, Cortes Y. Anaphylaxis in dogs and cats. J Vet Emerg Crit Care 2013; 23 (4): 377-394.
2. Silverstein DC, et al. Small Animal Critical Care Medicine (2nd ed). Chapter 152, Anaphylaxis. 2015.
3. Waxman, Courtney. “Not So Cute: Acute Anaphylaxis.” EVECC 2022 Congress. Veterinary Information Network, www.vin.com/doc/?id=11002085. Accessed 1 Apr. 2023.
4. Wurlod, Virginie. “How to Diagnose Canine Anaphylaxis in Your Emergency Room.” Western Veterinary Conference 2020. Veterinary Information Network, https://www.vin.com/doc/?id=9513714. Accessed 29 Mar. 2023.