



Pacific Tide

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Author of the month:



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Dr. Kim Delkener graduated from UC Davis School of Veterinary Medicine in 2002. The following year she completed a rotating internship in small animal medicine and surgery at the Veterinary Specialty Hospital of San Diego where the large emergency caseload gave her valuable experience in stabilization of the emergent patient, emergency surgery and critical care. She joined PVES in 2003. Dr. Delkener has a special interest in emergency surgery, enjoys challenging critical care cases and is passionate about all aspects of emergency medicine.

When she is not at work, she can be found enjoying many outdoor activities including mountain biking, volunteering for the Santa Cruz State parks and training her two border collies Pyro and Ari for dog agility competition on both the local and national level.

Canine Anaphylaxis

Allergic reactions and anaphylaxis are encountered regularly in veterinary medicine. Allergic reactions are typically defined as local hypersensitivity reaction or mild systemic hypersensitivity. Anaphylaxis refers to a severe systemic allergic reaction that is rapid in onset and potentially fatal. The patient's condition in anaphylaxis is usually much more emergent, and it is well documented that patients can die within the first hour after exposure to an allergen. Reactions are not always easy to define clinically, and can be considered a continuum from mild reactions to life threatening anaphylaxis. In the past, anaphylaxis has been considered a clinical diagnosis with laboratory testing often being of limited value. A readily available and easy to use diagnostic tool to aid in differentiating anaphylaxis from other differential diagnoses would prove highly valuable. Thankfully, in canine patients, this tool does exist and is indeed helpful in the emergency setting.

Anaphylaxis describes a severe type 1 hypersensitivity immune reaction characterized by dermal and systemic signs. In anaphylaxis, pre-exposure is necessary to stimulate the antigen/antibody response observed. An anaphylactoid response produces a very similar clinical syndrome, but is not technically immune-mediated, and can occur on an initial exposure to the antigen. The clinical signs and therapy are the same for both conditions. Common causes of anaphylaxis include vaccination, drug reactions, and insect bites/stings. Identification of a stinger in a patient, or a history of recent administration of a medication or vaccine, is not always available. Allergen exposure can be suspected based on circumstantial evidence like seeing a patient with a bee, finding a bee near a patient, or having a patient hold up a paw and cry out on a walk. Theoretically, any antigen, even fairly innocuous substances, can lead to an anaphylactic response. In veterinary medicine, the cause is often impossible to identify.

Identification of a stinger in patients can be key when examining an animal suspected to be experiencing a mild or severe allergic reaction. Astute doctors and nurses can become proficient at finding stingers, although very small, with guidance from the owner.

Anaphylaxis usually produces some degree of dermal, respiratory and cardiovascular signs. Cutaneous signs like urticaria and erythema develop rapidly, but can be more subtle in anaphylaxis. Vomiting and diarrhea are also frequent symptoms of anaphylaxis. These can be followed by hypotension, hypothermia and respiratory difficulty including bronchospasm, increased airway secretions and edema. Clinical signs can also be species dependent. In the dog, gastrointestinal signs are very common.

Often we do not know that a patient has been exposed to an allergen. When there is lack of historical information, the presence of two or more of the following are considered strongly suggestive of anaphylaxis-dermal signs, respiratory distress, vomiting/diarrhea and/or cardiovascular compromise/collapse. Diagnostic criteria for anaphylaxis would be especially helpful when tell-tale history and physical exam findings are not conclusive. Differential diagnoses for patients presenting with systemic signs can include other serious problems like liver failure, pancreatitis, gastrointestinal foreign body, toxin, seizure disorder, cardiac disease etc.

In December 2009, JVECCS published the article "Elevation of alanine transaminase and gallbladder wall abnormalities as biomarkers of anaphylaxis in canine hypersensitivity patients". The techniques described in this article are valuable diagnostic tools to aid in differentiating anaphylaxis from other differential diagnoses in the emergency setting. The study's goal was to evaluate hepatobiliary parameters in canine hypersensitivity patients in order to identify possible biomarkers of anaphylaxis. The gastrointestinal tract and venous system of the liver are considered primary shock organs in the dog. During an anaphylactic reaction, histamine is released from the GI tract into the portal vein resulting in hepatic venous congestion and portal hypertension. They found that an abnormal gallbladder wall (thickness > 3mm and striated appearance) and elevated ALT were statistically significant indicators of anaphylaxis. These two tests are readily available to first responder veterinarians. The technique in evaluating the gallbladder did not require specialized ultrasound training. General ultrasound or FAST experience was sufficient for quick and consistent identification. A brief abdominal ultrasound exam focusing on the gallbladder was all that was required. The procedure took approximately 3 minutes and was performed concurrently with other tests/treatments. Gallbladder wall thickness was measured and the presence of gall bladder wall striation (subserosal edema) was noted. Gallbladder changes also known as a halo or rim sign could focal or diffuse, and any degree of striation was considered abnormal. Gallbladder changes were found to be immediate in most dogs even before the elevation in ALT was noted. ALT levels were found to elevate rapidly, often within about 12 hours of a significant insult to the liver, and remain elevated for >24h, making it a useful test in the diagnosis of anaphylaxis. The study found that ALT levels usually returned to normal over a 2-3 week time frame.

Allergic reactions and anaphylaxis are medical emergencies that require immediate treatment. Delay in treatment can be life-threatening. Treatment for anaphylaxis typically outlined in the veterinary literature includes aggressive IV fluid therapy, glucocorticoids, antihistamines, epinephrine, bronchodilators, pressors and oxygen support. Corticosteroids may help resolve any cutaneous lesions and are effective in treating airway disease especially in cases of asthma. Histamine blockers may aid in cardiovascular stabilization and improve urticaria. Epinephrine administration and fluid resuscitation may be indicated in severe hypotension, severe respiratory compromise or if the patient is not able to be stabilized. National guidelines for human patients recommend that all patients with anaphylaxis be treated with epinephrine, and the WHO classifies epinephrine as an essential drug. Epinephrine blocks the effects of the mediators produced during anaphylaxis, increases cardiac output through positive inotropic/chronotropic effects, and promotes bronchodilation. Often therapy is dependent on the severity of the reaction. Most patients will show a complete resolution of signs, and can be discharged once they are eating and drinking well. However,

reoccurrence of signs is possible. Discharge medications may include corticosteroids, histamine blockers, and liver supportive medications; in addition to symptomatic therapy for ongoing clinical signs like diarrhea. Long term monitoring includes rechecking the ALT because its elevation should not be considered to be completely benign in these circumstances.

In my experience we do not always know if a patient is having an anaphylactic reaction, especially in the initial time frame they present. Failure to diagnose and appreciate the variable presentations of anaphylaxis is thought to lead to a propensity to under treat in human medicine. The authors of the JVECCS study feel a similar problem exists among veterinarians. Anaphylaxis is often a diagnosis of exclusion after the fact when other causes for severe life-threatening collapse have been eliminated. Early and accurate diagnosis of canine anaphylaxis is supported by utilization of the biomarkers described. I have evaluated many dogs for acute onset of collapse, vomiting and diarrhea that concurrently had elevated liver enzyme values and even sometimes ascites. When other differentials were ruled out, anaphylaxis was strongly suspected in these cases. It is nice to know that there are additional options for non-invasive supportive evidence to aid in establishing a presumptive diagnosis of anaphylaxis that are rapid and simple to perform. Please keep this study (JVECCS 12:2009) in mind when you are suspicious of anaphylaxis, and hopefully this will lead to more effective treatment for our canine patients.

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PVSES was founded to provide high quality, specialized medical care to companion animal patients. Our practice is dedicated to serving the veterinary community as a partner in total patient

care. We offer comprehensive specialized services including endoscopy, Doppler ultrasound, surgery, 24-hour ICU care, and emergency and critical care. Our

staff is committed to providing compassionate and thorough medical care that meets the needs of the patient, client, and referring veterinarian.

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