Acute Collapse & Vomiting Due to Unusual Toxicosis

This report described a 2-year-old spayed female Shetland sheepdog presented to the clinic for acute collapse and vomiting. The dog was unable to stand upon initial evaluation, but was responsive and maintained sternal recumbency; further examination revealed diffuse lower motor neuron dysfunction. Significant blood abnormalities included a stress leukogram, hemoconcentration, and severe hypokalemia (1.7 mEq/L; reference interval: 3.5–5.8 mEq/L). The dog was treated with intravenous fluids supplemented with potassium (0.5 mEq/kg/H); however, clinical disease progressed despite treatment. The dog began to improve clinically several hours postadmission and potassium concentrations began to normalize. The patient was ultimately discharged and clinically normal throughout a 90-day follow-up period. Barium toxicosis was diagnosed based on urine and plasma samples. This toxicosis is associated with hypokalemia and has previously been documented in humans but not in dogs. Barium salts are used in many industrial materials (glass, textiles, welding fluxes, and ceramic glazes), pesticides, depilatories, firework colorants, and radiographic contrast agents. However, barium sulfate, the radiographic contrast solution used in veterinary medicine, is very safe. The dog in this study may have scavenged dilapidated buildings and/or contacted barium carbonate rodenticides. Competitive potassium blockade at passive channels, which typically permits potassium ion efflux from the cell, is the mechanism of action and effectively causes a shift of extracellular potassium into the intracellular space. Clinical signs in humans include nausea, vomiting, diarrhea, abdominal pain, cardiac arrhythmias, hyporeflexia, skeletal muscle paralysis, muscle twitching, salivation, and hypertension. Treatment should target potassium and symptomatic therapy of other clinical signs.

Commentary: At first glance, the idea of barium toxicosis in veterinary medicine would most logically refer to barium administration in the clinical setting for radiographic imaging. Although rare, this paper highlights the utility of clinical references to human medical literature to assist in a veterinary diagnosis given unusual and dramatic clinical signs. This is particularly important when the risk for toxicosis exists and exposure is unknown.—Heather Troyer, DVM, Diplomate ABVP (Canine & Feline Practice)


CONTINUES
Comparing Allergy Testing Techniques

Canine atopic dermatitis is among the most common pruritic diseases of dogs. Diagnosis is made using clinical criteria after ruling out other causes of pruritus. Management and treatment is typically life-long and depends on the severity of clinical signs and seasonality. Allergen-specific immunotherapy (ASIT) is a fairly successful treatment modality. Allergy testing (in vitro or intradermal skin testing) is primarily performed to formulate ASIT therapy. A frequently used in vitro allergy test measures allergen-specific IgE concentrations by enzyme-linked immunosorbent assay; the HESKA Corporation (heska.com) uses a recombinant α-chain of the human high affinity IgE receptor (FcεR1α), which is very specific for canine IgE antibodies. This test was used to assess the intra- and intervariability of the HESKA Fc-ε receptor test in 3 laboratories. Serum from 15 dogs with confirmed atopic dermatitis was submitted in duplicate to each of the laboratories. All laboratories blindly performed the test; 2 expressed the results as optical density units (OD) and 1 expressed the results as reaction grades (RG). Sera were analyzed for 35 allergens in Laboratories A and C and for 15 allergens in Laboratory B. Intralaboratory variability for positive/negative results found measurement differences of only 3.14%. Laboratories A and C demonstrated a 1.34% interlaboratory variation for positive or negative results for 20 allergens. All 3 laboratories measured 15 allergens and the investigators identified a 9.33% difference. The overall interlaboratory difference was 4.76%.

Commentary: This study was conducted in Europe; the HESKA Corporation provides diagnostic laboratories with reagents and trained technicians in the test procedure in this market. Laboratories had the same reagents and trained personnel; however, there was evidence of sample result and laboratory variability. Variability was most common and clinically relevant with low OD values that measured close to the laboratory “cut-off” point. Many companies perform in vitro allergy tests in the U.S.; clinicians must recognize the presence of different methodologies without established standardization or quality control protocols. Literature searches must be performed when selecting companies for in vitro allergy testing to establish the presence of published results on their methodologies and independent validation. Finally, these tests only reflect exposure and do not establish whether or not the pet has atopic dermatitis. — Karen A. Moriello, DVM, Diplomate ACVD

Glomerulonephropathy Due to Overvaccination

This report described a clinical case of membranoproliferative glomerulonephritis (MPGN) in a young dog. The 7-month-old male cocker spaniel presented to the veterinary clinic with vomiting, diarrhea, lethargy, and anorexia. The puppy had been previously healthy with no prior disease, drug treatment, or toxin exposure. However, the puppy had been vaccinated by the owner (without veterinary direction) a total of 7 times (once per month) with a distemper/hepatitis/leptospirosis/parainfluenza/parvovirus (DHLPV) vaccine. The puppy was severely dehydrated on clinical presentation and demonstrated pale mucous membranes, oral ulcerations, halitosis, and abdominal pain. Several diagnostic procedures were performed, and ultrasonography revealed loss of renal architecture, increased cortical echogenicity, and bilaterally decreased kidney size. Complete blood count and serum biochemical values were consistent with renal disease, including anemia, severe azotemia, hyperphosphatemia, and hypoalbuminemia. Urine culture was negative. The puppy was aggressively treated for renal failure, including peritoneal dialysis, but died 3 days after hospital admission. Necropsy was authorized, and revealed ascites, retroperitoneal and abdominal edema, small pale kidneys, and kidney morphologic changes consistent with glomerulonephritis. Electron microscopy and immunohistochemical testing demonstrated the presence of deposits in the glomerular subendothelial spaces and the basal membrane; this was consistent with antigen-antibody immune complexes. In addition, antigens in the complexes were similar to the vaccine antigens in the DHLPV vaccine, suggesting that the glomerulonephropathy in this puppy was secondary to frequent and unnecessary vaccination.

Commentary: Although membranoproliferative glomerulonephritis is reported as 1 of the most common glomerulopathies in dogs, a definitive diagnosis and identification of the offending antigen are rarely identified due to the risk and expense associated with renal biopsies and electron microscopy. This case report demonstrates that injudicious use of vaccinations may, like other infectious or autoimmune diseases, lead to immune complex deposition and subsequent glomerular damage. When possible, appropriate education should be provided regarding the rationale for current vaccine guidelines to avoid overvaccination. Further studies are required at this time to determine the role, if any, that recent past and current vaccine protocols play in the development of protein-losing nephropathies. — Shawn Kearns, DVM, Diplomate ACVIM