



Although the human criteria and nomenclature were revised by the World Health Organization in 2008, the veterinary classifications have remained unchanged. Acute myeloid leukemia includes myeloblastic, monocytic, and myelomonocytic subtypes. Treatment response is comparable among subtypes, with a survival time ranging from 1 to 4 months. Chronic myeloid leukemia is rare, consisting of many well-differentiated cells. One of the difficulties in diagnosing acute lymphoid leukemia (ALL) is distinguishing Stage V lymphoma that has spread to bone from a true lymphocytic leukemia that has originated in the bone. The survival time for ALL ranges from 2 to 4 months. In animals with CLL, a lymphocyte count $>20,000/\mu\text{L}$ becomes a cause for concern.

Acute erythroid leukemias are not as common as in the past. This disease consists of increased blasts with a predominance of erythroid cells, and in cats it is associated with feline leukemia virus (FeLV) infection. Chronic erythroid leukemia, also referred to as *polycythemia vera*, is characterized by a very high hematocrit. In these cases, it is important to rule out other possible causes of erythrocytosis. Cases of megakaryocytic leukemias are very rare and usually have a poor prognosis. Chronic megakaryocytic leukemia is also extremely rare and is characterized by essential thrombocytopenia and a platelet count >1 million/ μL .

Atypical cell morphologies are the hallmark of myelodysplasia. Cell characteristics include binucleation, last-stage mitotic figures, megaloblastic cells, and hyper- or hyposegmented nuclei. This disorder is also associated with feline retroviruses such as FeLV and may develop into leukemia. Multiple myeloma is a proliferation of plasma cells. Monoclonal gammopathy, lytic bone lesions, light-chain (Bence-Jones) proteinuria, and $>20\%$ plasma cells in bone marrow are the criteria for a multiple myeloma diagnosis.

Several testing methodologies are used to diagnose and characterize leukemias. A complete blood count provides a white blood cell count and helps determine the presence of concurrent cytopenias or an inflammatory leukogram. Blood smear review identifies blast cells or dysplastic morphology. A bone marrow evaluation provides more cytologic detail and makes it easier to evaluate blast percentages. Cytochemical staining is an older method that has largely been replaced by immune-based methods, but it remains useful in some cases. Different lymphomas, such as B cell lymphoma and T cell lymphoma, can be differentiated with immune-based methods. Flow cytometry and polymerase chain reaction are also used to further delineate lymphoproliferative disease.

As leukemia research in humans continues to make advances in research, veterinary medicine is further behind in the field. But, concluded Dr. Schnelle, the hopes in the future are to find correlations with effective therapies and testing for minimal residual disease as well as further research into mutations with prognostic value.

Thorough Ear Cleaning and Control of Infections for Difficult Canine Otitis

Written by Toni Rizzo

Most difficult problems in managing canine otitis are the result of inadequate treatment, chronic inflammation, or failure to identify and control the underlying cause. According to James O. Noxon, DVM, Iowa State University, Ames, Iowa, USA, 2 key concepts are important to appropriate management of otitis. First, appropriate standard-of-care topical therapy must be used and any infections cleared, not just suppressed. Second, long-term maintenance is necessary to prevent recurrence.

Otitis treatment involves thorough cleaning and administration of medication to the entire ear canal. Oil-based ointments penetrate the skin better than do aqueous solutions but should be based on a light oil so that the medication can reach the entire length of the canal. The amount of medication to apply depends on the size of the ear canal, which varies according to weight. According to Dr. Noxon, the volume recommended on most ear products is too low and is a major source of treatment failure. He recommended applying medication by volume (mL) rather than drops but cautioned that too much can cause systemic effects. Once-daily administration is sufficient for most conditions. To completely clear otitis, medication should be applied for 30 days.

After treatment is completed, the patient should be rechecked. Maintenance therapy involves client education and intermittent use of antiseptics, therapeutics, and mild glucocorticoids until the primary cause is identified and controlled.

Pseudomonas infections, ceruminous otitis externa, and hyperplastic ear changes can be difficult to treat. *Pseudomonas* should be strongly suspected when a single population of gram-negative rods is seen on cytology. The identification can be confirmed with culture and susceptibility testing. Antibiotics are the primary treatment for *Pseudomonas* infection (Table 1). *Pseudomonas aeruginosa* can form a biofilm in the ear, increasing resistance to treatment; in such infections,

Table 1. Treatment of *Pseudomonas* Infection, Ceruminous Otitis, and Hyperplastic Ears

Type of Otitis	Treatment Principles
<i>Pseudomonas</i> infection	<p>Deep ear cleaning</p> <p>Identify and manage primary disease</p> <p>Treat according to culture and sensitivity results</p> <p><i>Topical therapies:</i> tobramycin, polymyxin B sulfates, Tris-EDTA, silver sulfadiazine, ticarcillin, Burow's solution</p> <p><i>Aggressive systemic therapy recommended:</i> oral antimicrobials (eg, fluoroquinolones), injectable agents (eg, amikacin, imipenem)</p> <p>Concurrent glucocorticoid therapy</p> <p>Treat for 2 wk past negative cytology and culture</p> <p>When cleared, start antiyeast treatment to prevent <i>Malassezia</i> infection</p> <p>Intermittent antiseptics for maintenance</p>
Ceruminous otitis	<p>Topical application of wax softener containing squalene 2-12 h before cleaning</p> <p>Deep ear cleaning</p> <p>Control secondary infections</p> <p>Weekly cleaning with basic ear cleanser</p> <p>Systemic therapy with vitamin A or retinoids</p>
Hyperplastic changes	<p>Potent topical glucocorticoids and systemic prednisone for hyperplastic changes</p> <p>Triamcinolone acetonide injection or long-term cyclosporine if ears not cleared in 3-4 wk</p> <p>Laser ablation if canal is calcified</p> <p>Control infections with appropriate topical and systemic antimicrobials</p> <p>Long-term therapy of weeks to months is indicated</p>

Tris-EDTA=tromethamine edetate disodium dihydrate.

the concentration of medication should be increased [Pye CC et al. *Vet Dermatol* 2013]. Tromethamine edetate disodium dihydrate (Tris-EDTA) is synergistic with some antibiotics, clearing antibiotic-resistant *Pseudomonas* infections. Tris-EDTA significantly potentiates the bactericidal activity of silver sulfadiazine against multidrug-resistant *P aeruginosa* [Buckly LM et al. *Vet Dermatol* 2012 (abstr FC-20)].

Ceruminous otitis most often accompanies familial seborrhea and may involve various infectious agents. The ear wax thickens and is difficult to remove. Progressive hyperplastic changes occur. Treatment consists of cleaning and control of infections (Table 1). Hyperplasia (lichenification) promotes a microclimate favoring microbial growth and prevents distribution of topical medications. Swelling may be due to inflammation and edema or fibrosis, including cartilage ossification. Diagnostic evaluation includes palpation of the ear canals and bullae for calcification or fibrosis; pain indicates bullae involvement. Otoscopic examination and imaging studies can help determine the extent of involvement. Hyperplasia and any infections should be treated as described in Table 1.

Dr. Noxon concluded that most difficult otitis cases develop when there has been a breakdown in communication or a failure to strictly adhere to the best ear management practices. Thorough ear cleaning and control of infections are necessary.

Diagnosis and Treatment of Digestive System Disorders in Reptiles

Written by Toni Rizzo

Digestive system disorders in reptiles are a diagnostic challenge because of the variations in gastrointestinal (GI) anatomy and physiology among species of reptiles. Christoph Mans, DVM, University of Wisconsin, Madison, Wisconsin, USA, presented an update on the latest advances in diagnostic techniques and therapy that have provided practicing veterinarians with tools for improved diagnosis and treatment of GI disorders in reptiles commonly maintained as companion animals.

Diagnosis is based on evaluation of the animal's history and clinical signs, tests for parasites, and imaging studies. Environmental temperature should be considered a factor in digestive problems because of its effects on enzyme secretion, peristalsis, and intestinal absorption. Generally, digestion cannot take place at temperatures <45°F (7°C) and is slow between 45°F and 60°F (7° to 15°C). Other factors to look for are anorexia and weight loss, regurgitation in snakes, vomiting in lizards, diarrhea, constipation, cloacal tissue prolapse, and abdominal or coelomic distention.

If a parasite is suspected, a fecal sample or cloacal wash may be microscopically examined on a direct wet mount or stained smear. *Cryptosporidium* and *Entamoeba invadens* can be diagnosed with polymerase