Common Reptiles and Their Diseases

Adolf K. Maas, DVM
Avian and Exotic Animal Hospital, PLLC
Bothell, Washington

As clinicians, we see certain diseases in patients on a greater frequency than other conditions; many of us have heard the report that for the typical dog and cat practitioner, 90% of all conditions seen fit within 12 diseases. This rule essentially follows true for the reptile practitioner, except that there are probably a dozen common diseases for each of the three families of reptile seen in practice, the chelonians or turtles and tortoises, the lizards and the snakes.

Three areas of knowledge are essential to proper disease workup, diagnosis and treatment:

1) Species-specific husbandry and natural history
2) Pharmacokinetics and pharmacology of reptiles
3) Physiological and disease susceptibility differences between families/species

With these areas of knowledge, a practitioner can rule in or out a large number of diseases when combined with a thorough history and physical exam. This will allow the veterinarian to make informed decisions regarding choices of diagnostic tests to be run. Furthermore, it will facilitate the design of a treatment plan that will be both safe and as effective as possible.

The most common species seen may vary depending on the clientele as well as the availability by breeders and/or wholesalers in a given geographic area. The following is a brief historical list of the more common species seen by this practitioner over the last 5 years:

Snakes: Corn snake, red-tailed boa, ball python, Burmese python, king snake, garter snake

Lizards: Leopard gecko, bearded dragon, savannah monitor, green iguana, veiled chameleon

Chelonians: Red- and yellow- eared slider turtle, North American box turtle species, Russian tortoise, Greek tortoise, leopard tortoise

Although it would be very easy to lump all the individuals of each familial list into three simple categories for husbandry and natural history, it would be a fatal mistake for most of the species listed. Instead, treat each species just as that; an individual category of animal with unique requirements for proper housing, nutrition and care. Incidently, none of the species listed above within each group have identical care requirements to any of the other members within its family.

To simplify matters, however, there can be some grouping to help manage proper husbandry. Instead of categorizing by family, categorize by environment/ecocline (i.e. hot desert vs. temperate desert, tropical rainforest vs. mountain wetlands, arboreal vs. ground dwelling, etc). This will help to design a preferred optimal temperature range

(POTZ), humidity, substrate, ventilation and so on. Next, categorize by diet (strict carnivore, high vs. low protein herbivore, insectivore, herbivore dominant insectivore, etc.) to design a nutritional plan. Lastly, include activity cycles (diurnal, crepuscular or nocturnal), species specific habits and native range to create a reasonably accurate husbandry plan.

Pharmacology for reptiles is just as unique as the species within the categories. Never treat a reptile "like a small dog or cat", and never rely on "quick fixes" and rarely on "old cures". Medicine for our reptilian patients is changing rapidly and as clinicians we must be proactive to keep current on the best available therapies for our patients. For example, a study was conducted several years ago that found that there is no antibiotic on the market that does not cause renal damage in reptiles, and one of the worst is one of the most commonly used (and abused?). The message herein is that for any disease condition, the clinician is responsible for picking their "weapons" carefully and use them cautiously.

Unlike cat- or dog-specific diseases, several infectious diseases carry cross- infectivity between dissimilar families of reptiles and for the majority of the rest, epizootiology is still unknown. However, the majority of the pathological conditions seen in reptiles have an underlying etiology in their husbandry.

The one summary that can be made for reptile medicine is that 90% of all conditions seen in these species are caused by underlying husbandry issues. If a clinician merely treats

only the disease process they see in their reptile patient, it is likely that the patient will later succumb again either to the same issue or a related one.

The following is a list of the more common disease etiologies seen in each of the families of reptiles over the last five years by this practitioner:

Chelonia

GI- parasites, stomatitis, bacterial enteritis, viral diseases, hemorrhagic gastroenteritis

Respiratory: viral, rhinitis, hypovitaminosis A, mycoplasmal/bacterial pneumonia

Liver: hepatic lipidosis, bacterial/viral hepatitis

Renal : bacterial nephritis, toxin/drug, protein overload, bladder stones, nephrocalcinosis

Reproductive: dystocia, penile prolapse

Metabolic: MBD, hyperparathyroidism,

Dermal: shell fractures, animal(dog) bite, hyper- or hypovitaminosis A, viral, burns

Systemic: Septicemia, Shell rot/ SCUD

Lizards

GI: viral, parasitic, bacterial overload, prolapse, neoplasia

Respiratory: viral, aspiration/bacterial pneumonia, rhinitis

Neurological: viral, trauma, seizures

Liver: hepatic lipidosis, bacterial/viral hepatitis

Renal: drug/toxin, nephritis, hyper- or hypovitaminosis A or D

Reproductive: POOS, dystocia

Metabolic: MBD, hyperparathyroidism,

Dermal/Trauma: fractures, digit and other bite wounds, burns, parasites

Systemic: lymphoma, septicemia, systemic mycosis

Snakes:

GI: stomatitis, viral enteritis, parasites, prolapse

Respiratory: viral pneumonia, bacterial pneumonia, parasites

Hepatitis: viral, lipidosis, bacterial hep

Renal: viral, visceral gout/failure, toxin/drug

Skin: burns, bacterial/viral/fungal dermatitis, bite wounds, parasites, disecdysis

Reproductive: POOS, dystocia, hemipene prolapse, uterine infections

Systemic: Septicemia, spondylosis deformans

ALL SPECIES:

Sanitiation

Ventilation

Temperature

Light cycle

Diet

Herptile Viruses

Adolf K. Maas, DVM
Avian and Exotic Animal Hospital, PLLC
Bothell, Washington

In domestic animal medicine viral infections are not uncommonly encountered and are expected in many situations. Most small animal veterinarians can interpret the presentation of a puppy with bloody diarrhea and vomiting as a risk factor for parvovirus, or a cat with hallmark ocular lesions and nasal discharge as a possible herpes infection. Testing for common (and now less common) viruses is becoming easy and affordable; with some so simple they can be performed in the exam room in less than five minutes. New viral outbreaks are rapidly being identified, their pathology becoming well understood, while rapid, inexpensive, accurate testing is being developed (for example, Canine Influenza). In general, virology and viral infections of domestic animals are an intrinsic and common aspect of veterinary medicine.

What about our reptile and amphibian patients? Many types of viruses have been historically identified in reptiles and amphibians, but are primarily presented in the technical literature. Even when new viruses are identified, little is know about the pathology or even the spectrum of susceptible species. As advances are made in herp medicine and these species of pets are becoming more important family members, just as dogs and cats already are, viral diseases need to be considered as differentials when ill animals are presented to the practitioner. Just as in domestic animal medicine,

knowledge of the viruses, diagnostic techniques and pathology are necessary to recognize, treat and prevent the spread of these conditions.

The basic problem with virology in reptiles and amphibians is there have been only a small number of viruses identified in these species and little is known about their host relationship and mechanisms of transmission. Still far less is known about the potential of these viruses to infect other species of herps and the effect they may have on those animals. This has become a much greater concern with the trend of herp owners to keep multiple species from disparate parts of the world. This may create collections with multiple naïve species that are susceptible to disease from a particular virus. Thus, any virally infected animal must be considered to be infectious and potentially dangerous to any other member of a collection.

To start to diagnose a viral disease in a herptile requires the same basic knowledge as it does in any species. The clinician must have a thorough history, with background on the husbandry and origin of the animal, potential exposures to a source, and knowledge of species susceptibilities to viral diseases. Clinical findings and symptoms from a physical exam then can correlate to include possible viral diseases on the differential list.

Snakes

Adenovirus:

Hepatitis

Enteritis

Neurological Signs

Herpesvirus:

Hepatitis

Poor venom/saliva production

IBD virus:

Neurological Signs

Hepatitis

Nephritis

Paramyxovirus:

Neurological Signs

Respiratory Disease

Reovirus:

Neurological Signs

Respiratory Disease

Lizards

Adenovirus:

Enteritis

Heptatis

Herpesvirus:

Hepatitis

Stomatitis

Skin Lesions

Oral Neoplasia

Iridovirus:

Stomatitis

Hepatitis

Respiratory Disease

Skin Lesions

Paramyxovirus:

Respiratory Disease

Poxvirus:

Skin lesions

Reovirus:

Respiratory Disease

Chelonians

Herpesvirus:

Hepatitis

Tracheitis

Stomatitis

Rhinitis

Skin Lesions

Iridovirus:

Stomatitis

Rhinitis

Hepatitis

Tracheitis

Enteritis

Papillomavirus:

Skin Lesions

Picornavirus:

Stomatitis

Rhinitis

Enteritis

Respiratory Disease

Poxvirus:

Skin Lesions

Reovirus:

Stomatitis

Rhinitis

Crocodilians

Adenovirus:

Enteritis

Hepatitis

Flavivirus:

Enteritis

Hepatitis

Stomatitis

Neurological Signs

Poxvirus:

Skin lesions

Amphibians:

Herpesvirus:

Skin Lesions

Neoplasia

Ranavirus:

Acute death

Flavivirus

Togavirus:

Possible Zoonotic reservoir

Adenovirus

Parvovirus

Erythrocytic virus:

Unknown

Since symptoms are very rarely pathognomonic, testing for a virus must be pursued for a definitive diagnosis. There are three primary modalities for viral disease determination:

a) Polymerase chain reaction (PCR) testing, which identifies the specific genetic material of a virus that is present. This modality is rapidly becoming the preferred clinical diagnostic technique due to rapid testing, general ease of sample collection, high specificity and sensitivity and low cost. The problems with PCR testing are that it is available for only a few viral diseases, its specificity can exclude other disease etiologies, and a few, critical, viral tests are very expensive with stringent sample requirements.
b) Antigen detection (AD) probes for viral proteins within a sample, can be variable in both sensitivity and specificity, and is also only available for a few herptile viral diseases. These tests are more problematic in sample collection as they may require a larger serum or tissue sample than many of our herptile patients can provide, results take longer and costs of these tests are highly variable.
c) The gold standard of viral diagnostics is that of virus isolation (VI). This process has high sensitivity (because the virus is amplified), but this test is very non-specific in that it will propagate any virus present in the sample. This can be advantageous because if virus X is suspected in a disease, both PCR and AD will be negative if disease is caused by virus Y, while VI will be able to isolate both or either. The limitations of VI are that it is time consuming, much more expensive than either PCR or AD, sample collection and handling can both create

inaccuracies in the test, and, because it is has low specificity in a field of low relative collective knowledge, the clinician may not be able to determine if the presenting disease is caused by the virus(es) identified.

Diagnosis of viral conditions in reptiles and viruses is difficult even with positive results, and often, due to lack of affordable options, diagnosis is based on elimination of other possible disease etiologies. As with any condition in any other species, completion of a minimum data base is necessary to survey the health of the patient, determine the systemic effects the virus may be having, and if there is any indication of secondary infections or diseases present. A complete blood count, serum chemistry, ionized calcium, full fecal analysis, cultures, radiographs, and cytologies may be all indicated or other diagnostics may be necessary depending on the presentation of the patient.

The greatest difficulty with herptile viral diseases is the lack of specific treatment plans. As with most viral diseases in other species of animals, there are few viruses that have specific, effective treatment options while most require supportive care until the patient is able to clear the virus on their own. Unfortunately, many known reptile viral pathogens do not clear from their host and can either develop into chronic conditions or become fatal. This means that the clinician has two primary roles in herptile viral disease management:

1) Attending to the individual patient: Supportive care, as stated, will be required to assist the patient through the acute crisis, and diagnosis needs to be made on the

antemortem patient. Long-term nursing care is often the norm, as the care needed is usually beyond the abilities of the average pet owner. A few viral diseases have specific treatments available, but for most there is none. Unless the animal is the only herp within the collection, proper quarantine procedures should be implemented to prevent potential spread of the disease. Be certain to present to the owner a realistic prognosis, as many viral diseases do not have good outcomes and infectivity rates are often high to other species of reptiles and amphibians.

2) Attending to the collection: The value of the individual must be balanced against the value of the collection. In many cases where a larger population of animals is at risk, euthanasia and sample collection for identification techniques (often multiple) is the best option. Collection of oral and fecal samples, whole blood and serum, and fresh frozen tissues and formalin fixed samples are all recommended in the event that the first round of testing does not yield diagnostic results. Definitive diagnostics will be of the greatest value to the large collection owner in the ability to mitigate long-term damages.

Excursions into Rabbit Dentistry

Adolf K. Maas, DVM
Avian and Exotic Animal Hospital, PLLC
Bothell, Washington

Rabbits are becoming much more common as house pets the world over. In the US, rabbits are now the third most common house pet, after cats (first place) and dogs (second). Rabbits as house pets in Europe now outnumber dogs, taking second place only to cats. It makes sense, really; rabbits are quiet, affectionate, easy to care for, able to be trained to use a litter box, intelligent, and don't believe competitive hair-ball-chucking should be an Olympic event!

With the increase number of rabbits as domestic house pets, small animal practitioners need to know how to recognize and diagnose common conditions so that either they may provide appropriate treatment or they can refer these pets to a specialist for care. As is the case for any condition seen in any species, proper interpretation of the symptoms is absolutely mandatory for proper diagnosis.

Dental conditions are one of the more common presentations seen in "ADR" rabbits. This creates a problem since there are no pathognomonic signs seen to help the practitioner definitively diagnose dental disease in a lagomorph. Instead, symptoms of dental disease in rabbits range from the obvious, such as a purulent drainage coming from the gingival margin of tooth, to the obscure relationship seen between pica and dental disease. The following is a list of symptoms that are more commonly associated with dental conditions in rabbits:

A partial list of symptoms associated with dental disease

- Soft stools/diarrhea
- Inappetance/Anorexia
- Facial masses
- Inappropriate urination
- Anemia
- Trichobezoars
- Excessive grooming
- Ptyalism
- Nasal discharge, unilateral or bilateral
- Pica
- Weight loss
- Pain (localized or general)
- Constipation
- Pneumonia
- Inability to swallow
- Dyspnea
- Alopecia
- Exophthalomos
- Lymphadenopathy
- Gastric bloat
- Ileus
- Epiphora
- Conjunctivitis or other ocular disease
- Abnormal/new behaviors
- Facial dermatitis

- Perianal/inguinal dermatitis
- GI impaction
- Tongue/Cheek lesions
- Poor coat condition
- Changes in food preference

As with any medical condition in any species of patient, the first step is identifying the problems. And, as with any patient, a thorough physical examination and history is the most important step to an accurate diagnosis.

The purpose of the history is to allow the clinician to be able to mentally picture the environment the patient lives in and any factors that may be related to their current condition. This would include the source of the animal with breed information, the numbers of cage/housemates, the brand and composition and amount of the food, hay and treats provided, the texture and amount of stools produced, light cycle, temperature ranges, size and location of cage, and any other husbandry details available. Any behavior, activity and physiological changes seen by the owner, no matter how subtle, should be reviewed in detail. Do not be afraid to directly interview the owner as to the duration of the presenting problem and early symptoms as well as supposedly unrelated issues they might have seen in the recent or distant past. It is strongly recommended that all questions be covered three times; once in the intake form filled out by the client, again in the interview by the intake technician/assistant, and lastly by the doctor. More than once it has been seen that clients will give a much more detailed account on the third questioning than on the first.

The next step is a thorough physical examination. Since dental disease can affect virtually all other aspects of the health of a rabbit, examination of the entire animal is essential. Once the entire animal has been examined for overall health and stability, a complete and systematic examination of the patient's mouth be performed awake to allow for a basic assessment of the situation. The clinician must have good knowledge of normal occlusion and dentition as well as familiarity with variants of normal before pathology can be accurately determined. It is generally advised to perform the oral exam last, as many rabbits will become stressed or agitated and will need a rest after the teeth are examined. Later, after any pre-anesthetic or other health concerns have been addressed, a more in-depth, tooth-by-tooth assessment should be made while under general anesthesia.

Imaging and diagnostics are necessary for both completing the diagnosis and planning an appropriate course of therapy for the patient. A complete blood count, full serum chemistries and 4-6 view skull and jaw radiographs are considered the minimum data base needed for a basic work-up. Intraoral radiographs may be helpful, but are considered to be of limited usefulness. More advanced conditions or particular cases may require serum titers, cultures and sensitivities, oral and/or nasal endoscopy, biopsy and histopathology, and/or CT/MR imaging. It is advisable to remember in any case that the severity of symptoms may not correlate to the severity of disease, and severe symptoms may be seen with mild disease just as likely as mild symptoms are observed with severe disease.

It is appropriate to treat lagomorph dental conditions as surgical cases, as there are very few exceptions where treatment can be obtained only by medical management. However, the clinician must carefully consider the overall health of the patient before instituting any anesthetic procedure. Most dental conditions involve mild to moderate pain, many have some degree of secondary GI involvement, with both dehydration and anorexia as common presenting symptoms. It is common to find the presentation of rabbits with primary dental disease in critical condition. The overall stability of the patient must be addressed before surgical treatment is initiated.

There are many options for treatment of dental conditions found in rabbits. For simple, uncomplicated overgrown teeth, a comparably simple trim may suffice, but this is an unusual finding. Often, overgrown teeth are caused by metabolic conditions or infectious/inflammatory processes deep in the bone and with many of these the only presenting symptom is that of the maloccluded teeth. Moderate to severe problems may require extractions, and some of these may require significant extra-oral surgery to remove and/or drain abscesses. Many severe cases will require multiple treatments and/or surgeries to obtain a complete resolution. Presenting the full known scope of the disease and giving a realistic expected outcome to the patient's owner is a valuable step in providing quality medical care, as well as reviewing both the pre- and post-operative care that will be necessary. Looking for a "cheap and easy" treatment method will often result in unsuccessful end-products, unhealthy patients, and unhappy owners.

As is the case in all specialized procedures, proper instrumentation is essential. Treatment of dental conditions in rabbits has made many advances in recent years, as has there been advances in equipment. A review of essential equipment will be presented.