Snakes: husbandry and common health problems

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Categories: Exotics, Vets

Date: November 24, 2014

Snakes are a diverse group of reptiles comprising more than 3,000 species and found throughout the world on every continent except Antarctica (www.reptile-database.org).

Although similar to lizards in many ways, their elongated shape, fused eyelids and lack of limbs or external ears give them a completely different appearance to other animals treated in a veterinary practice. They are, however, increasingly popular pets, especially the smaller species.

For the veterinary surgeon, they can make challenging patients; clinical examination can be limited and signs of disease may be difficult to detect in an animal that spends the majority of its time in a fairly inactive state.

This article will concentrate on the most common types of non-venomous snakes kept in captivity – the corn snake (Pantherophis guttatus), king/milk snakes (Lampropeltis species), boas and pythons (Figure 1). Venomous species have extremely specific requirements and legislation, and advanced training is strongly recommended before considering dealing with these snakes.

Natural behaviour and housing needs

Although many snakes can appear relatively inactive at times, it is still important to provide them with sufficient space to exercise. A snake’s vivarium should be at least long enough to allow the snake to stretch out (larger if possible). However, supervised exercise outside the vivarium can also be beneficial, both for environmental enrichment and to prevent obesity. The vivarium should be easy to clean and secure to prevent escape.

As with other reptiles, providing the correct range of temperatures and humidity is critical and this will vary depending on the species. Care should be taken to protect snakes from having direct contact with heating devices as burns are not uncommon and can be extensive (Figure 2).
Snakes do not appear to have an absolute requirement for UVB lighting as they are able to absorb sufficient oral vitamin D\textsubscript{3} from their whole prey diet without the need for endogenous production. However, corn snakes have been shown to still have the capability to use UVB light to produce endogenous vitamin D\textsubscript{3} and a light:dark cycle is likely to be of behavioural benefit, even if high levels of UVB lighting are not thought to be required.

Most snakes naturally feed on whole vertebrates in the wild, killing them either by constriction or envenomation. In captivity, snakes should only be fed pre-killed prey, usually small rodents or rabbits. Overfeeding is common as a snake’s energy requirement may only be two per cent to five per cent that of a similar-sized mammal. For example, an adult corn snake may only need to be fed one small rat every seven to 14 days. Care should be taken to ensure food is completely defrosted before feeding, and handling the snake should be avoided around time of feeding and for the following day.

Common problems and veterinary care

Once husbandry and diet have been established, a full clinical examination of the snake should be performed. Most small snakes can be easily restrained by a single person, but extra restraint may be required for larger animals. A cold reptile cannot be properly assessed so animals may need to be admitted to be warmed up for full assessment.

Body condition can be assessed based on prominence of the dorsal spine, which should be surrounded by muscle (Figure 3). It is helpful to check the sex of the snake to rule in or out reproductive conditions and, if this is unknown, most snakes can be easily probed by gentle insertion of a well-lubricated metal probe or urinary catheter up the cloaca in a caudal direction (Figure 4). In male snakes the probe will usually pass to a depth of more than six ventral scales whereas in females the probe will often only pass to a depth of two to six scales. Otherwise, examination follows a logical head-to-tail format as for other animals. A variety of problems may be seen, but a few common presentations are listed.

Stomatitis

Stomatitis is a common presentation and is often related to husbandry deficits, such as low temperatures or poor hygiene. Usually caused by an overgrowth of commensal Gram-negative bacteria, snakes are often presented due to a period of anorexia. On oral examination, areas of erythema and caseous purulent material can be seen. Treatment involves systemic antibiotics (ideally based on culture and sensitivity), analgesia and topical cleaning of the lesions. General anaesthesia may be required for debridement if lesions are extensive and skull x-rays should also be considered in these cases to screen for associated osteomyelitis. It is always important to identify and correct the underlying cause to prevent recurrent problems.

Pneumonia
Respiratory infection is often a sequel of stomatitis with bacteria from the oral cavity descending to the lower respiratory tract.

Various viruses may also affect snakes, including ophidian paramyxovirus (oPMV) and inclusion body disease (IBD). Occasionally, fungal infections may also be seen (Miller et al, 2004).

Reptiles cope well with hypoxia due to their great capacity for anaerobic metabolism and their low metabolic rate. Therefore, if dyspnoea is seen, prognosis is often poor as compensatory mechanisms have been overwhelmed. Clinical signs may be subtle and include lethargy, anorexia, spending more time stretched out and, eventually, gaping and oral discharges. Obvious dyspnoea is often not seen until late in the course of disease.

Diagnosis is usually by imaging and x-rays are the most commonly used, but CT is preferred, if available, to detect more subtle lesions. A tracheal wash may also be performed to obtain material for cytology, culture and sensitivity. Choice of systemic antibiotics may then be based on culture results. For both upper and lower respiratory tract disease the use of nebulisation can be very helpful in conjunction with systemic therapy.

Dysecdysis

One of the most common skin issues seen in snakes is a problem with shedding (dysecdysis).

This may occur for a variety of reasons, usually related to poor husbandry – such as inappropriate temperature, humidity or lack of a rough surface to rub skin against. Alternatively, underlying skin disease such as mites, burns or bacterial or fungal infections may be a concern. It is important to identify possible predisposing factors when presented with a reptile with dysecdysis. In snakes, skin should come off as whole, but if shed in parts, then the tail tip or spectacles are often retained (Figure 5).

Treatment is usually fairly simple and involves increasing environmental humidity, warm water baths and gentle manipulation of retained skin with a wet cotton bud to aid removal. Retained skin should never be pulled off with excessive force as tissues below may be easily damaged. Problem areas (for example, areas of scarring) may need treatment over several consecutive sheds before the problem is fully resolved.

Mites

The mite *Ophionyssus natricis* is a significant problem in many reptile collections and can be hard to eliminate. The main reason for this is mites do not spend their entire life cycle on the reptile, but have several resting non-feeding stages (Wozniak and DeNardo, 2000).

Snakes are normally irritated by mites and this may be seen by changes in behaviour, such as
spending more time soaking in water. Alternatively, owners may see mites on the reptile or in the environment. As previously mentioned, mites often result in dysecdysis, but can also cause more serious problems such as anaemia and have been suggested to be involved in the transmission of some infectious diseases (such as oPMV).

Diagnosis is usually by direct visualisation of mites. Mites are a brown-black colour and commonly found between scales, especially around the eyes, mouth and cloaca. In the environment they may be found in dark moist places such as cracks in wood. Identification of mites on a sticky tape strip confirms diagnosis.

Various treatments are available, although there are anecdotal reports of toxicity associated with many and there is no 100 per cent safe and effective treatment for all species. Common choices are either fipronil or ivermectin. Fipronil may be applied to a damp cloth and wiped over the animal at weekly intervals (or every other day in a severe infection). Ivermectin may be administered by injection although some species (such as indigo snakes) appear particularly sensitive and an alternative treatment should be used in these species.

Concurrent treatment of the environment is vital to prevent recontamination, but infections can be difficult to eliminate, especially from wooden vivaria. Vivaria may be treated with the same parasiticides as used on the animal, but should be allowed to air fully before the reptile is returned to this environment. All substrate should be discarded and replaced with paper that is changed daily. All cage furniture should also ideally be discarded and disposable hides such as cardboard boxes used until the infection has cleared.

**Ophidian paramyxovirus (oPMV)**

oPMV is a significant viral infection in pet snakes. It is especially common in viperids, boas and pythons, but can be seen in a wide range of snake species.

Transmission is by direct contact, but is also thought to be via snake mites. Clinical signs may be respiratory or neurological and will generally lead to death. This should be considered as a major differential diagnosis for any snake with neurological signs. Diagnosis has traditionally been on paired serology. However, a PCR test has become available and diagnosis can be made from an oral or cloacal swab. Treatment is supportive only and euthanasia is generally advised.

**Inclusion body disease (IBD)**

IBD is another significant infection in pet snakes. It is especially common in boas and pythons, although it can also be seen in a range of other snake species.

The exact cause was unknown for years, but a study showed it to be caused by an arenavirus (Hetzel et al, 2013). Clinical signs may be gastrointestinal or neurological and will invariably lead to
death. Boas appear to present more commonly with regurgitation and gradual weight loss, with neurological signs only occurring at the terminal stage of disease. In pythons, the disease progresses more quickly with neurological signs and death at an early stage.

IBD should also be considered as a major differential for any snake with neurological signs. Diagnosis has traditionally been based on finding inclusion bodies in cells, especially within the liver and oesophageal tonsil in a live snake or brain and pancreas postmortem. Now PCR testing is available for arenavirus based on an ethylenediaminetetraacetic acid blood sample and oesophageal swab. However, similar to oPMV, treatment is supportive only and euthanasia is generally advised.

**Common techniques**

**Venipuncture**

Snakes can either be blood-sampled from the ventral tail vein or the heart. The ventral tail vein is preferred, but may be challenging to access and large samples can be difficult to obtain, especially in small snakes. Cardiocentesis is a relatively straightforward technique, but potentially carries the risk of cardiac trauma (Selleri and Girolamo, 2012). However, a study looking at the effects of repeated cardiocentesis in ball pythons reported no adverse effects despite each snake being sampled 39 times over the course of the study (Isaza et al, 2004).

The apex beat of the heart is usually easy to identify approximately one-third of the way down the body, but use of a Doppler probe may aid in locating the heart prior to sampling. Care should be taken to ensure the snake is well restrained if using this technique (Figure 6).

**References and further reading**


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Elsevier, Missouri.

Figure 1. A royal or ball python (*Python regius*) named for its tendency to curl into a ball when threatened.
Figure 2. Burns can be deep and extensive so all heat sources should be protected from direct contact with the snake.

Figure 3. This corn snake was severely underweight, as shown by its prominent spine with minimal associated muscle mass.
Figure 4. In this snake the probe could be inserted to a depth of 12 scales confirming it was male.

Figure 5. Retained spectacles are a common consequence of dysecdysis.
Figure 6. Snakes should be well-restrained for cardiocentesis.