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DIAGNOSIS AND TREATMENT OF SICK AND INJURED REPTILES AND MAMMALS

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Introduction

In Australia sick and injured native reptiles and mammals are common patients at veterinary clinics. Experienced wildlife veterinarians are often contacted by colleagues to provide advice in the treatment of these animals. This paper is not meant to be comprehensive. It will however outline some common presenting conditions, explaining a logical approach to diagnosis and treatment. Helpful tips relating to therapies and handling techniques for native fauna are included.

The joey with diarrhoea

Common causes of diarrhoea in orphaned joeys are candidiasis, salmonellosis, colibacillosis and coccidiosis. A full physical examination should always be undertaken. Joeys are often dehydrated and listless and will frequently lick their forelimbs when distressed. Signs of gut pain include grinding of the teeth and bloating. Faecal analysis will rule out coccidiosis, an often fatal disease in eastern grey kangaroo joeys in the transitional stage (weaning off milk and progressing to solids) and candidiasis. Joeys with candidiasis have a sickly sweet smell to their faeces and oral lesions (palque and ulcers). There is often a history of antibiotic therapy, leading to an overwhelming yeast infection. Diagnosis is made by microscopic examination and culture of lesions and faeces for the presence of yeasts. Nystatin is the recommended treatment. Antibiotics should be used judiciously and adequate attention paid to hygiene. Oral or parenteral fluid therapy may be required. Faecal cultures should be performed in order to diagnose salmonellosis and other bacterial infections. Carers should be warned of the zoonotic potential of salmonellosis.

The greasy possum

Exudative dermatitis is a chronic ulcerative or proliferative dermatitis affecting the common brushtail (*Trichosurus vulpecula*).¹ Lesions typically include alopecia, exudation, crusting and in severe cases ulceration. An offensive odour is often present and the fur is matted and easily pulled out. The cause of the condition is likely to be multifactorial involving a variety of ectoparasitic, bacterial and fungal agents, trauma and stress.¹ Mixed bacteria such as *Staphylococci*, *Streptococci* and *Corynebacteria* are commonly present, but are likely to represent secondary infection.¹ Exudative dermatitis is frequently seen in dispersing subadult males, particularly in densely populated areas.

When treating these cases consideration must be given to the fate of the animal after rehabilitation. The release of a possum, especially a young male, back into a highly populated area, is not recommended. Severely affected animals should be euthanased. Topical and parenteral treatment (amoxycillin)

is usually required. Spray preparations of chlorhexidine 0.05% can be used. Possums frequently resent applications of medications, especially on raw or ulcerated lesions and frequently require sedation or anaesthesia. In severe cases, anaesthetised animals may need to be clipped and bathed using antiseptic shampoo. Ointments containing silver sulphadiazine and chlorhexidine digluconate (Silvazine®, Smith and Nephew) or other commonly available small animal topical antibiotic, antifungal and corticosteroid preparations may be applied.

The burnt possum

Burns are common in free-ranging common brushtails and common ringtails either as a result of bushfires or direct contact with hot surfaces such as stove tops and fireplaces. Adequate pain relief (butorphanol tartrate [Butomidor Injection®, Ausrichter, 10mg/ml] 0.1-0.4mg/kg IM) and antiinflammatory treatment (meloxicam (Metacam®, Boehringer Ingelheim, 1.5mg/ml) 0.2mg/kg SC or tolfenamic acid (Tolfedine®, Ausrichter, 40mg/ml) 4mg/kg SC) should be given as soon as possible. Most animals will require anaesthesia for proper assessment of the degree of tissue damage. A decision whether to treat or not to treat should also be made as soon as possible. Treatment of wounds is similar to that for exudative dermatitis.

The red bellied black snake caught in netting

The red bellied black snake, *Pseudechis porphyriacus*, eats frogs and reptiles. During summer snakes frequently become entangled in bird netting used to protect outdoor ponds and plants. Often the netting becomes deeply embedded in the skin of the reptile. Most entanglements can be dealt with while the snake is manually restrained. If the wounds are on the caudal body restraint is managed by the use of a clear plastic tube. Snakes are coaxed head first into the tube and once a good portion of the snake has entered the snake is restrained by holding snake and tube in the one hand. If the injuries are more cranial restraint can be more difficult, often involving “heading” the reptile by an experienced handler.

Small tears and lacerations can be glued rather than sutured. Alfaxalone anaesthesia can be administered to “tubed” snakes via the ventral tail vein to facilitate examination and treatment in a safe manner.

The dog bite blue tongue

The common eastern blue tongue, *Tiliqua scincoides scincoides*, is a common prey for the family dog. Just with any dog attack victim a small puncture wound may not be an accurate indicator of the extent of the injuries suffered by the animal. Routine pain relief (tolfenamic acid 4mg/kg IM) and antibiotics (enrofloxacin [Baytril®50 Antibacterial Injection, Bayer, 50mg/ml] 10mg/kg SC q48 hrs) should be administered; the latter for at least 8 days. Radiography often reveals punctured or collapsed lungs and intracoelomic haemorrhage. An exploratory coeliotomy will occasionally be required in order to assess accurately the nature of the injuries. Alfaxalone at a relatively high dose rate of 10mg/kg IV, by the ventral tail vein is recommended. Lizards are intubated

and maintained on isoflurane and oxygen. Intubation can be difficult as the glottis is quite caudal and the tongue slippery and difficult to retract. A spatula is best used to identify the glottis. Intermittent positive pressure ventilation is given at 4-6 per minute, reducing to 2 per minute once a surgical stage of anaesthesia is reached.

The squashed turtle^{2,3}

In eastern Australia the common eastern long-necked turtle, *Chelodina longicollis*, is a common victim of the motor vehicle. Turtles are presented to veterinary clinics in various states of shell trauma. It is important to identify the extent of trauma to underlying soft tissue. Fractures of the bridge have a poor prognosis as there is often damage to the underlying viscera. Male turtles may be presented throughout the year for treatment however females are usually more likely to wander when seeking nesting sites in late spring and early summer. Veterinarians should become skilled in gender determination and radiograph all injured females. Injured egg bearing turtles may require induction of egg-laying. Oxytocin is used (10-20 U/kg SC or intracoelomically [ICo]) in conjunction with warm water soaks. Turtles usually lay 30-60 minutes post injection. Fractured shells are repaired using a variety of techniques, including wiring and ultraviolet light cured dental composite. Often injured turtles need to be "overwintered" so wildlife carers must be well-versed in the specific nursing and husbandry needs of rehabilitating turtles. A combination of "dry docking", partial or total immersion may be required, depending upon the site of the injury. Freshwater turtles will only eat in water, so methods must be devised to accommodate this habit and still keep wounds dry and clean.

The flying fox with a torn flight membrane

Membrane tears are best not sutured and will eventually contract and seal naturally. Bats with large tears should be euthanased as extensive contraction of tissue will prevent the animal from flying. Tears should be treated as open wounds, applying chlorhexidine and saline topically. Care should be taken when handling bats, ensuring that all handlers, veterinarians and nurses are vaccinated against rabies. Emerging zoonotic diseases including Australian Bat Lyssavirus (ABL) and Hendra virus affect the megachiroptera (fruit bats) and microchiroptera (small insectivorous bats).

Venipuncture

Turtles

- Long necked (*Chelodina longicollis*) – jugular
- Short necked (*Emydura spp.*) – dorsal tail vein, metatarsal vein (larger turtles)

Lizards (skinks, dragons and monitors) and snakes – ventral tail vein
Possums, joey kangaroos and wallabies - lateral tail vein

Restraint

Firstly ask the question whether the animal needs to be handled. Often medications can be given in food and short examinations carried out without the need to handle the animal. Transferring animals from cage to cage or container to container may also be done without direct contact, thereby reducing the stress to the animal. If an animal, particularly a mammal, needs to be examined closely it is best done under general anaesthesia.

Anaesthesia

Reptiles

Reptiles should always be anaesthetised at their preferred body temperatures (PBT), for example:

- Freshwater turtles (26C)
- Blue tongues (33C)
- Diamond pythons (29-30C)
- Bearded dragons (33C)

Alfaxalone is a safe and effective intravenous anaesthetic in reptiles. Recovery is smooth, with lizards and snakes taking approximately one hour to resume consciousness while turtles are slower taking 2-3 hours to recover. For lengthy procedures reptiles are intubated and maintained on isoflurane and oxygen administered by intermittent positive pressure ventilation (IPPV), 2 cycles per minute, 2-3%. Pythons may be intubated while conscious and induced with IPPV at 6 cycles per minute at 4-5%, until a surgical plane of anaesthesia is achieved and then reduced to 2 cycles per minute at 2-3%.

Echidnas

Gaseous anaesthesia using isoflurane and oxygen is the preferred method for echidnas. Anaesthetic masks for echidnas are fashioned from 10 ml syringe cases. Patience and great care are needed to apply the mask around the tender beak. The front legs of an echidna are very strong and will repeatedly attempt to pull off the mask. Echidnas are best handled for anaesthesia draped over the forearm of the assistant with the beak and front legs facing the anaesthetist.

Possoms and macropods (kangaroos and wallabies)

Alfaxalone at a dose rate of 2mg/kg IV or tiletamine/zolazepam (Zoletil®, Virbac) 2mg/kg IV or 4-5 mg/kg IM (Larry Vogelneust, veterinarian, *pers comm*) are commonly used for anaesthetic induction or short anaesthesia. Intubation can be difficult in macropods due to their long, narrow oral cavity and pharynx. Maintenance of anaesthesia using a mask is usually quite adequate. Large possums can be intubated without difficulty. Mask induction of possums and macropods using isoflurane and oxygen can be carried out while the animal remains within a hessian bag.

Flying foxes

Flying foxes should be fasted prior to anaesthesia. Medetomidine (Domitor® Novartis, 1mg/ml) 0.1mg/kg IM and Ketamine (Ketamine®, Parnell

Laboratories, Australia) 2-2.5mg/kg IM are a safe and reliable injectable anaesthetic combination in flying foxes. Mask induction with isoflurane and oxygen can also be used. Animals may be intubated, the operators taking great care to avoid being bitten. Handlers should wear gloves at all times.

What drugs can be used?

Antibiotics

Enrofloxacin (Baytril®50 Antibacterial Injection, Bayer, 50mg/ml; Baytril®25 Antibacterial Oral Solution, Bayer, 25mg/ml)

- Reptiles 10mg/kg SC q48 hrs
- Mammals 5-10mg/kg SC sid or 5-10mg/kg PO sid

Amoxicillin (Moxylan®, Jurox, 150mg/ml)

- Mammals 7-10mg/kg IM sid or 10mg/kg PO bid

Amoxicillin trihydrate (Betamox LA®, Norbrook, 150mg/ml)

- Mammals 15mg/kg IM q48hrs

Clindamycin (Antirobe Aquadrops®, Pfizer; Antirobe Capsules®, Pfizer)

- Mammals 11mg/kg PO bid

Penicillin (150mg/kg procaine penicillin and 112.5mg/kg benzathine penicillin) q48hrs – cat and dog dose rate

Nystatin (Mycostatin, Nilstat)

- 5000-10000 U/kg tid for 5 days to counter any secondary fungal or yeast infections during antibiotic therapy.
- 50,000 U/kg tid for 7 days in the treatment of oral candidiasis.

Anthelmintics and topical antiparasitic preparations

Ivermectin (Ivomec®, Merial, 10mg/ml)

- Reptiles 0.02 ml/kg

Praziquantel 20g/L Oxfendazole 20g/L (Wormout Gel®, Vetafarm)

- Reptiles 0.05 ml/100g

Fipronil (Frontline Spray®, Merial, 2.5g/L)

- Mammals – stickfast fleas – apply sparingly to fleas with a cotton bud. Also used on dasyurids

Selamectin (Revolution®, Pfizer) – use cat and dog dose rate for sarcoptic mange in wombats

NSAIDs, analgesics and anaesthetics

Tolfenamic acid (Tolfedine®, Ausrichter, 40mg/ml)

- Reptiles and mammals 4mg/kg IM sid

Meloxicam (Metacam®, Boehringer Ingelheim, 1.5mg/ml)

- Reptiles and mammals 0.2mg/kg

Diazepam (Pamlin®, Parnell Laboratories, 5mg/ml)

- Mammals – 0.5-1 mg/kg

Butorphanol tartrate (Butomidor Injection®, Ausrichter, 10mg/ml)

- Reptiles and mammals - 0.1-0.4mg/kg IM

Alfaxalone (Alfaxan®-CD RTU, Jurox) – see anaesthetic section

Medetomidine (Domitor®, Novartis, 1mg/ml)

Ketamine (Ketamine® Parnell Laboratories, 100mg/ml) – see anaesthetic section

Disclaimer

Veterinarians treating sick and injured mammals and reptiles should be aware of the risks involved with respect to envenomation and zoonotic disease. Veterinarians should advise clients of the “off label” use of drugs mentioned in this manuscript. The notes are meant as a guide only and advice contained within may change with time.

References

1. Hemsley S (1994) Dermatitis in free-living common brushtail possums (*Trichosurus vulpecula*). *Australian Veterinary Practitioner* 24, 147-155.
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3. Johnson R (2006) Dystocia in an injured common eastern long-necked turtle (*Chelodina longicollis*). *Vet Clin North Am Exot Anim Pract.*:9(3):575-81.