Common Conditions of Wildlife Part 2: Mammals

Introduction

Wildlife casualties are commonly presented to veterinary practices, and many general practitioners feel daunted by the huge diversity of species and conditions which they are expected to treat. This webinar is the second in a series of two, which aim to demonstrate how to apply basic principles and commonly used techniques to less familiar species, and some adaptations that may be required for the effective management of wildlife in practice. For information on common conditions of wild birds, please see the archived webinar and associated notes from 10th November 2016.

A range of birds, mammals, reptiles and amphibians may be presented as injured, sick or orphaned patients. One of, if not the most commonly presented wildlife species presented to general practitioners is hedgehogs. Whilst many of the skills and knowledge that apply to domestic mammals can be extrapolated, there are a few idiosyncrasies of hedgehogs that many domestic vets may not be familiar with. This webinar aims to help practitioners gain confidence with hedgehogs, as well as discussing other wild mammals that may be brought into practice. The focus of this webinar will be on diseases, conditions and treatment of land mammals although many of the principles of wildlife medicine apply to all wild animal casualties.

General Principles of Wild Mammal Medicine

Many of the sample basic principles that we apply every day with our domestic patients apply to wild mammal patients. The initial assessment as to whether a wild animal is viable for treatment, rehabilitation and release, or whether it requires euthanasia or indeed immediate release is key to successful wildlife medicine. Many of the conditions that we will discuss are treatable, but it is important to always conduct complete, systematic clinical examinations to ensure that concurrent diseases, injuries and conditions, which may impact on the decision are not overlooked.

A distance examination is an important part of the clinical exam – not least in determining whether a wild animal is strong enough to withstand a full physical examination. Many of our wild mammal patients, such as rabbits and rodents are prey species, and so mask clinical problems effectively. Clinical examination and assessment is complicated further in some species by their various idiosyncrasies such as torpor in bats, or the ability to tightly curl into a ball of spikes. Abnormalities such as lameness, ataxia, visual impairment and unusual behaviour can best be noted by observing patients from a distance. It should be remembered that there is a huge degree of variation between normal parameters for different species, and some knowledge of behaviour and ecology of wild mammals is beneficial.

Body condition score is an essential part of the initial examination. This can give the clinician important information about how a wild animal has been coping with any
Body condition of wild mammals is usually primarily assessed using lumbar fat deposits and rib and pelvic prominences, as with other mammalian species. This is however more challenging in some species such as hedgehogs, where palpation and visualisation of subcutaneous fat is compromised by the presence of spines. Other species have very different shapes to what we might expect in domestic mammals - for example seals carry a large amount of blubber, and shouldn’t have a discernible waist, and badgers are very muscular and stocky, and generally appear wider than the average pet dog.

A full clinical examination should include, but is not limited to assessment of:

- Demeanour
- Vision
- Gait
- Range of movement of all limbs and joints including pelvis
- Skin wounds
- Ectoparasites
- Anal tone
- Oral cavity
- Aural exam
- Respiratory auscultation
- Cardiac auscultation
- Palpation of long bones
- Temperature if appropriate, safe and indicated
- Flight (in the case of bats)

Flight test should be conducted only once a full clinical examination has been carried out, to rule out any injuries that will clearly preclude flight such as wing membrane tears or wing fractures. Bats should be warmed up prior to flight testing, and their heart rate allowed to rise before flight. They should be able to demonstrate 10 minutes of continuous flight without showing any signs of tiring to be confident in their flight prior to release.

After a clinical examination, a decision can be made as to whether any injuries or disease that are observed are treatable. Triage, stabilisation and euthanasia are covered in a previous webinar.

Health and Safety is an important consideration when handling and working with all wild mammals. Even small mustelids can give a nasty bite, and some of the larger species can pose a serious hazard if not handled carefully. Foxes, badgers and otters have very strong jaws, and can be quick to turn. Even apparently unconscious animals should be handled with care as they can quickly come round and may be frightened and aggressive. Sedation and/or anaesthesia is often required for full clinical examination but careful consideration should be given to drug protocols in animals with cardiovascular compromise. The author often uses intramuscular
midazolam and ketamine in these cases. Deer pose a significant risk, especially to inexperienced handlers, and experienced assistance should be sought where possible. Even small deer are capable of eviscerating a human with a kick, and handlers should always stay on the opposite side to the legs. Small mammals such as rodents including squirrels often require gaseous anaesthesia for examination, or examination through a transparent box, in order to safely assess ambulation and any injuries. Hedgehogs and rabbits pose minimal physical risk to handlers, although consideration should be paid to the risk of zoonotic disease such as ringworm, nematodes, salmonella and other bacteria. Similarly bats, although they don’t cause significant injury if they bite the handler, can carry a rabies like virus, European Bat Lyssavirus 2, and vaccination and protective gloves should be encouraged for anyone handling bats.

The following are some of the most common conditions with which the commonly presented wild mammals may present to veterinary practitioners.

### Out During the Day Hedgehog

| Introduction: | Hedgehogs are crepuscular – so their main periods of activity are dawn and dusk. Individuals found out during the day are often sick or injured, and activity during daylight is one of the most common reasons for presentation for veterinary examination. During the breeding season, nursing or pregnant female hedgehogs may be found foraging for food during daylight hours in order to sustain their reproductive state, although this can be very difficult to determine without clinical examination. |
| Species commonly affected: | Hedgehogs |
| Causative agent: | Various – non-specific clinical sign |
| Frequency: | Very common |
| Clinical signs: | Out in daylight hours |
| Diagnosis: | Full investigation – may require anaesthesia to conduct thorough clinical exam |
| Treatment: | Variable |
| Prognosis: | Variable |

### Too small to hibernate

| Introduction: | Hedgehogs have two principle breeding seasons – Spring and late Summer. |

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Hoglets born in the later breeding season, may be presented having failed to gain enough weight for hibernation. Hedgehogs are often presented underweight for the time of year, and need supportive care and rehabilitation until they are at an appropriate release weight. This depends on the time of year (see Table 1). They should only be released if temperatures are forecast to be over 5°C for 3 consecutive days post release.

<table>
<thead>
<tr>
<th>Species commonly affected:</th>
<th>Hedgehogs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Causative agent:</td>
<td>Various – non-specific clinical sign</td>
</tr>
<tr>
<td>Frequency:</td>
<td>Very common</td>
</tr>
<tr>
<td>Clinical signs:</td>
<td>Often out in daylight hours</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td>Full investigation – may require anaesthesia to conduct thorough clinical exam</td>
</tr>
<tr>
<td>Treatment:</td>
<td>Rehabilitation and supportive care until up to appropriate release weights.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Time of Year</th>
<th>Minimum Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>April – Mid Summer</td>
<td>400g+</td>
</tr>
<tr>
<td>Sept-Nov</td>
<td>500-600g</td>
</tr>
<tr>
<td>Dec-March</td>
<td>600g-700g</td>
</tr>
</tbody>
</table>

Prognosis: Variable

Cat predation

Introduction: Predation by domestic pets is a common presenting reason for small wild mammals such as bats and rodents. Cat bite puncture wounds may not be clearly evident, and as such, any animals that presents with a history of, or with suspicion of cat predation should be treated with a course of antibiotics.
<table>
<thead>
<tr>
<th><strong>Species commonly affected:</strong></th>
<th>Bats (those roosting in human habitation most at risk), rodents, moles, small mustelids</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Causative agent:</strong></td>
<td><em>Pasteurella multocida</em> most common isolated pathogen</td>
</tr>
<tr>
<td><strong>Frequency:</strong></td>
<td>Very common</td>
</tr>
<tr>
<td><strong>Clinical signs:</strong></td>
<td>Puncture wounds may or may not be evident</td>
</tr>
<tr>
<td><strong>Diagnosis:</strong></td>
<td>Presumptive Radiography to rule in/out fractures</td>
</tr>
<tr>
<td><strong>Treatment:</strong></td>
<td>Broad spectrum antibiotics, eg Potentiated Amoxicillin various doses BID for 5 days. Analgesia and supportive care as required. Primary closure of any larger superficial wounds. NB Bats must be warm in order to be able to metabolise drugs.</td>
</tr>
<tr>
<td><strong>Prognosis:</strong></td>
<td>Variable</td>
</tr>
</tbody>
</table>

**Dog predation**

| **Introduction:**               | Predation by domestic pets is a common presenting reason for hedgehogs, rabbits and other small mammals. Dog bites are often more serious than they initially appear, with examination under general anaesthesia often indicated. Often these cases will be presented with very old wounds, with necrosis. Deliberate, and illegal baiting of badgers by dogs, and fox hunting with dogs is still occasionally seen. |
| **Species commonly affected:** | Hedgehogs, Rabbits, Badgers                                                              |
| **Causative agent:**            | Mixed bacterial infection                                                                |
| **Frequency:**                  | Common                                                                                   |
| **Diagnosis:**                  | Thorough examination and probing of wounds to establish true extent Radiography to rule in/out fractures |
| **Treatment:**                  | Broad spectrum antibiotics, eg Potentiated Amoxicillin BID for 5 days (except rabbits – Enrofloxacin at 10mg/kg SID) Analgesia and supportive care as required. |
**Prognosis:** Variable

**Road Traffic Accidents**

**Introduction:** All mammals are susceptible to road traffic accidents, but only the larger mammals are likely to survive to be presented to a vet. RTA injuries are more common at certain times of year, for example when animals are dispersing. It is important to remember that being hit by a vehicle may also be as a result of underlying conditions such as impaired vision or neurological problems. NB. Deer often suffer capture myopathy as a result of major traumatic events and recumbent deer post RTA carry a grave prognosis.

**Species commonly affected:** Deer, Foxes, Badgers, Otters

**Causative agent:** N/A

**Frequency:** Common

**Diagnosis:** Radiography to rule in/out fractures, contusions, internal haemorrhage

**Clinical signs:** Variable

**Treatment:** Analgesia, NSAIDs and supportive care as required.

**Prognosis:** Variable

**Fractures**

**Introduction:** Mammals commonly present with fractures of the long bones and pelvis as well as skull fractures. The treatment, viability and prognosis varies dramatically depending on the type and location of fracture. Compound, comminuted, multiple, old, displaced, skull and joint fractures all carry a poor prognosis in wild animals. Simple, transverse, mid shaft fractures can be managed surgically or in some cases with external coaptation however consideration should be given to predicted time to release as this may be prohibitive in many cases.

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**Species commonly affected:** All  
**Causative agent:** Trauma  
**Frequency:** Common  
**Clinical signs:** Variable depending on fracture site and species. Hedgehogs may easily hide even major or multiple fractures.  
**Diagnosis:** Radiography to rule in/out and fully characterise fractures  
**Treatment:** Analgesia and supportive care as required. Support bandage as first aid measure. Euthanasia often appropriate.  
**Prognosis:** Variable

### Orphans

**Introduction:** Wild animals are commonly presented as true or perceived orphans. This is most common during the Spring and Summer months.

**Species commonly affected:** Leverets (Hares), Fawns (Deer) – commonly mistakenly presumed to be orphaned as often left alone for long periods of time by the dam. Foxes, badgers, hedgehogs, rabbits, bats, often presented for hand rearing or rehabilitation as juveniles.

**Causative agent:** Varied  
**Frequency:** Very Common  
**Clinical signs:** N/A  
**Diagnosis:** Thorough history, identification of species, checking carefully for presence of dam.  
**Treatment:** Examination to check for injuries or disease. Regular feeding of species appropriate feed. Multiple daily feeds often required and milk replacement varies between species – cat/dog replacement milk not always appropriate without supplementation. Toiletting usually required as with hand rearing of domestic mammals. Transfer to an experienced rehabilitator as soon as possible, and be aware of risk of imprinting.  
**Prognosis:** Good (less good for unweaned rabbit)
Ectoparasites

Introduction: Ectoparasites are a common finding, particularly in debilitated animals. A range of mites and ticks are common findings, with fly strike being also common in spring and summer months.

Species commonly affected: All – most commonly; Foxes – sarcoptic mange; Hedgehogs – ticks (*Ixodes hexagonus*, fleas (*Archeopsylla erinacei*), and *Capirinia tripilis* plus myiasis; Bats – mites, bat bugs (*Cimex spp*)

Causative agent: Varied - Heavy burdens of parasites are often secondary to other debilitating or immune-suppressive conditions. In particular, animals with missing or non functional limbs, or missing teeth may be unable to groom one area of their body, and develop unilateral or excessive ectoparasite burdens, so if noted, this warrants further examination, often under general anaesthesia.

Frequency: Common

Clinical signs: Often appear debilitated. Lice, ticks, blowfly larvae, Cimex bugs and some mites can be identified with the naked eye.

Diagnosis: Thorough examination and consideration of underlying conditions/grooming defects. Microscopic examination of tape strips or skin scrapings are useful in suspected cases of mange.

Treatment: Fipronil 0.25% spray (**NB NOT RABBITS/HARES**) Ivermectin 0.2mg/kg IM, orally, topically Permethrin powder Various spot on treatments

Prognosis: Variable as often underlying disease
### Endoparasites

**Introduction:** Endoparasites are a common finding, particularly in debilitated mammals.

**Species commonly affected:** All (see specifically Lungworm in Hedgehogs)

**Causative agent:** Many nematodes, cestodes and protozoa can be responsible for clinical disease mammals, especially when in high numbers.

**Frequency:** Common

**Clinical signs:** Poor body condition score, may identify adult nematodes, larvae or eggs on faecal exam.

**Diagnosis:** Faecal analysis including flotation

**Treatment:**
- Ivermectin 0.2mg/kg PO
- Fenbendazole 20-50mg/kg
- Probiotics can be useful adjunctives
- Pyrantel/Febantel/Praziquantel (Drontal plus for routine worming of fox and badger cubs)

**Prognosis:** Varied

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### Dermatophytosis

**Introduction:** This is the most commonly contracted zoonotic disease in wildlife. In one study, over 25% of hedgehogs were found to have ringworm, some of which may be sub clinical.

**Species commonly affected:** Hedgehogs, occasionally seen on foxes, badgers

**Causative agent:** The most common causative agent in hedgehogs is *Trichophyton erinacei*, so use of a Wood’s lamp in diagnosis is very limited, although hedgehogs and other species may carry *Microsporum spp.*

**Frequency:** Common

**Clinical signs:** Spine loss, alopecia, scurf, crusting.

**Diagnosis:** Diagnosis is usually made by culturing the pathogen from affected spines or skin scurf using an in house dermatophyte test medium such as Dermayfyt or sending to an external
### Treatment:
There are a range of treatment protocols including oral Itraconazole or Terbinafine, and/or topical Enilconazole.

### Prognosis:
Good if no underlying immune-compromising disease.

## Lungworm complex

### Introduction:
Lungworm is very common in Hedgehogs and a common reason for juvenile hedgehogs to be out during the day, or found underweight prior to hibernation.

### Species commonly affected:
Hedgehogs. Foxes can also be infected with *Angiostrongylus vasorum* and *Crenosoma vulpis*.

### Causative agent:
The two parasitic nematodes that are responsible for lungworm complex are *Crenosoma striatum* and *Eucoleus (prev Capillaria) aerophilus*. Both of these parasites may be found in isolation or in mixed infections, often compounded by secondary bacterial infection and inflammation. *Crenosoma* adults and larvae are found in the airways and alveolar ducts and *Eucoleus* adults are found in the bronchi and trachea.

### Frequency:
Common

### Clinical Signs:
The signs of disease in hedgehogs vary according to the severity of the parasite infestation in the lungs and whether or not there is any secondary bacterial infection present. Signs of lungworm, therefore, can range from no disease to snuffles, wheezes, nasal discharge, increased respiratory effort (sometimes with rattling breathing), cough, weight loss, reduced appetite, weakness, reduced activity, staggering gait and open mouth breathing. In severe cases, the disease can cause death.

### Diagnosis:
Microscopy of faecal wet prep or flotation and identification of eggs.
### Imprinted/Tame juveniles

<table>
<thead>
<tr>
<th>Introduction:</th>
<th>Often seen as a result of irresponsible hand rearing. Great care should be taken to ensure than juvenile animals don’t imprint as tame/imprinted wild mammals are rendered non releasable.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species commonly affected:</td>
<td>Fox cubs, Deer fawns, Badger cubs</td>
</tr>
<tr>
<td>Causative agent:</td>
<td>Human hand rearing</td>
</tr>
<tr>
<td>Frequency:</td>
<td>Common</td>
</tr>
<tr>
<td>Clinical Signs:</td>
<td>Lack of fear or inhibition, voluntarily approaching people, vocalising</td>
</tr>
<tr>
<td>Diagnosis:</td>
<td>Identification of signs above</td>
</tr>
<tr>
<td>Treatment:</td>
<td>Moving into social groups as soon as possible, limited exposure to humans (including voices), hands off rehabilitation.</td>
</tr>
<tr>
<td>Prognosis:</td>
<td>Guarded</td>
</tr>
</tbody>
</table>

### Myxomatosis

<table>
<thead>
<tr>
<th>Introduction:</th>
<th>This is the most common viral disease of wild rabbits.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Species commonly affected:</td>
<td>Rabbits</td>
</tr>
<tr>
<td>Causative agent:</td>
<td>Myxoma virus (Pox Virus) transmitted by insect vectors – most commonly the rabbit flea – <em>Spilopsyllus cuniculi</em></td>
</tr>
<tr>
<td>Frequency:</td>
<td>Very Common</td>
</tr>
<tr>
<td>Clinical signs:</td>
<td>Ocular and nasal discharge, blindness, swelling of face and genitalia, crusting of...</td>
</tr>
<tr>
<td><strong>Condition</strong></td>
<td><strong>Description</strong></td>
</tr>
<tr>
<td>---------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Capture Myopathy</td>
<td>Capture myopathy is a common sequel to any traumatic event or prolonged recumbency, or capture attempt in deer. Long legged birds such as cranes and herons are also susceptible although this is rarely seen in the author's Centre.</td>
</tr>
<tr>
<td>Wing tears in bats</td>
<td>Bats are commonly presented with holes or tears in their wings. Tears are defined as holes that extend to and include the external wing margin.</td>
</tr>
</tbody>
</table>

### Wing tears in bats

**Introduction:**

Bats are commonly presented with holes or tears in their wings. Tears are defined as holes that extend to and include the external wing margin.

**Species commonly affected:**

Pipistrelle bats and other synanthropic bats

**Causative agent:**

Often cat predation. Also barbed wire fence, other trauma

**Frequency:**

Very Common

**Clinical signs:**

Visible holes or tears in the wing membranes

**Diagnosis:**

Holding bats up to light helps to identify smaller lesions in the wing membrane

**Treatment:**

Smaller holes and tears will heal with time. Antibiotics are often required if there is a suspicion of cat predation, and bats should be kept warm and hydrated throughout treatment. The use of skin glue or sutures to close wounds is not required and is often contraindicated.

**Prognosis:**

Variable – can require prolonged rehabilitation and thorough flight testing prior to release

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**Capture Myopathy**

**Introduction:**

Capture myopathy is a common sequel to any traumatic event or prolonged recumbency, or capture attempt in deer. Long legged birds such as cranes and herons are also susceptible although this is rarely seen in the author's Centre.

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<thead>
<tr>
<th><strong>Species commonly affected:</strong></th>
<th>All deer species, long legged birds, hares</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Causative agent:</strong></td>
<td>Stress, heat, capture, struggling eg to get free from railings, transport</td>
</tr>
<tr>
<td><strong>Frequency:</strong></td>
<td>Common</td>
</tr>
<tr>
<td><strong>Clinical signs:</strong></td>
<td>May be asymptomatic, recumbency, muscle stiffness, paresis or paralysis, sudden death at point of capture,</td>
</tr>
<tr>
<td><strong>Diagnosis:</strong></td>
<td>Post Mortem examination – pale cardiac muscle, pulmonary and hepatic congestion, myoglobinuria.</td>
</tr>
<tr>
<td><strong>Treatment:</strong></td>
<td>Reducing stress at capture, early release, limiting transport, keeping cool, early sedation. Often euthanasia most appropriate course of action.</td>
</tr>
<tr>
<td><strong>Prognosis:</strong></td>
<td>Poor</td>
</tr>
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