



Triage and first aid for wild hedgehog casualties



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ABSTRACT This article provides a basic outline of how to triage and provide first aid for wild hedgehogs presenting in veterinary practice. Most hedgehogs that present in practice have experienced some form of injury and require immediate veterinary attention. Veterinary professionals have a duty of care for these patients. A clear triage process and appropriate first aid is key to an ethical and successful outcome.

Keywords Triage, hedgehog, handling, wildlife protocol

Introduction

The Animal Welfare Act (2006) protects wild animals that are no longer able to function in the wild, most commonly due to injury and unnecessary suffering. *Erinaceus europaeus* (wild hedgehog) often present in veterinary practice for a variety of reasons and veterinary professionals are responsible for the appropriate treatment and rehabilitation of these animals under the Act. The RCVS Code of Professional Conduct for veterinary surgeons (VSs) and registered veterinary nurses (RVNs) also states that animal welfare must be the overriding consideration in all cases (RCVS, 2021). This article discusses the provision of triage and first aid

for wild hedgehogs presented in veterinary practice and considers common conditions.

Current status

Mathews and Harrower (2020) listed hedgehogs as having vulnerable status in the UK and at high risk of extinction in the wild. Hedgehog numbers are declining for a variety of reasons, including agricultural intensification, an increase in predators (badgers, domestic cats and dogs), an increase in road traffic, and climate changes that influence hibernation. An increase in building in the UK, including fencing and driveways, has also led to the loss of, or limited access to, appropriate habitats for hedgehogs. Hedgehogs are often presented to us in veterinary practice, occasionally without injury. Hedgehogs should be thoroughly assessed, treated, and released or rehabilitated, where possible, to support the wild hedgehog population.

Triage

Triage is the process of determining the priority of a patient's treatment based on the severity of its condition. Triage in wildlife medicine is a brief, logical examination to differentiate between those casualties that are likely to be rehabilitated and those that require immediate euthanasia (Mullineaux, 2014). The initial triage often begins with the veterinary receptionist, following a call by a member of the public. Williams (2010) suggested the use of a wildlife protocol which details when a wild hedgehog should be brought to the practice (**Table 1**). On presentation, an RVN can begin the initial triage process, while the receptionist gathers information such as the contact details for the person who brought the hedgehog in, the reason for rescue, the location in which the hedgehog was found,

Table 1. Signs a hedgehog needs help.

Signs	
Lethargic	Out in the open, sleeping or with minimal movement
Flies	Lots of flies on or around the hedgehog (likely to have myiasis)
Ataxia	Ataxic when walking and moving (likely due to a limb injury)
Injured	Obviously injured, commonly by road traffic, cats or dogs
Trapped	Caught in netting, a pond or drain
Hoglets	Hoglets seen out in the day without an adult and/or squawking
Out in the day	It is rare for healthy hedgehogs to be out in the day but they may just be building a nest so monitor initially

and whether any initial treatment, food or water has been provided (Williams, 2010). Vickery (2020) noted that, where possible, rehabilitated hedgehogs should be released where they were found. The site should have a suitable food source, shelter, evidence that the same species is thriving there and safety from over-predation. Hedgehogs are territorial animals and have a higher chance of survival if they are returned to their known environment. It is also important to note that the translocation of hedgehogs can introduce diseases to new areas and affect those populations.



A key factor to consider when triaging a wild hedgehog is the likelihood of a successful outcome. Molony et al. (2007) found that only 30–40% of wildlife casualties were successfully released back into the wild. There may be instances when a hedgehog can be treated medically but will not be released due to a lack of facilities. Veterinary practices should work closely with local wildlife centres to facilitate rehabilitation where possible.

RVNs are often involved in the initial triage of wildlife and should be familiar with the normal parameters of wild hedgehogs (**Table 2**). An initial parameter check should be performed in a quiet area and include temperature, heart rate, respiration rate, body weight and hydration status. It may not be possible to assess rectal temperature and the extremities should be assessed

Table 2. Normal hedgehog parameters.

Parameters	
Weight	Males: 400–600 g Females: 300–600 g
Lifespan	Average 4–6 years
Rectal temperature	35.4°–37°C
Heart rate	180–280 bpm, reducing to as low as 2–48 bpm during hibernation
Respiratory rate	25 to 50 breaths per minute (up to 1 hour of apnoea during hibernation)

instead; hypothermic hedgehogs will feel noticeably cold to the touch (Bexton, 2017). The majority of hedgehogs presented in veterinary practice will have a physical injury or illness; a brief examination should identify any life-threatening conditions. The recordings should then be noted and reported to the VS. Timely intervention is especially important if euthanasia is a consideration (Williams, 2010). Hedgehog casualties are rarely immediately released back into the wild, as they are unlikely to be handled by the general public without a cause for concern (such as being out during the day or a known injury). However, hedgehogs will curl up as a normal defence mechanism and can be easily picked up and handled, whether they are healthy or unhealthy. The outcomes following triage may be euthanasia, first aid or immediate treatment (Mullineaux, 2017).

Euthanasia

Euthanasia is often a necessary course of action for wildlife casualties with a poor chance of eventual release, and is usually the most realistic option in cases of severe injury (Bullen, 2014). Long-term captivity of wild hedgehogs is very rarely an acceptable alternative to euthanasia (Mullineaux, 2016). Some factors indicating euthanasia could include:

- More than one major injury, especially those involving the mouth, nose, and limbs
- A large area of burnt or lost prickles
- A pelvic injury (especially in female hedgehogs)
- Permanent blindness
- Lack of rehabilitation services

Euthanasia should be performed by anaesthetising the patient, followed by an intracardiac or intravenous (cranial vena cava) injection of pentobarbital (Hand, 2021). Euthanasia should not be performed without appropriate anaesthesia.

Handling

A 'suitable' hedgehog casualty is one that can be returned to the wild in a physical condition that allows it to survive in an equivalent way to other members of its species, including being able to walk, feed, defend itself and its territory, and potentially reproduce (Mullineaux, 2017).

Before veterinary examination, the hedgehog should be adapted to a quiet, calm area where examination can take place – stressed hedgehogs are likely to bite, jump or hiss, and could injure themselves further in the process (McClure, 2011). Appropriate personal protective equipment (PPE) is needed as hedgehogs may cause injury and can carry zoonotic disease.

It is a common misconception that hedgehogs must be examined under general anaesthesia due to their curling

into a ball – most hedgehogs will uncurl with the correct handling techniques (Collins, 2004). Suggested methods of hedgehog handling include:

- Placing onto a clear surface or clear box and waiting for the hedgehog to move; the hedgehog can then be examined from underneath the box.
- Gently cupping in a towel and bouncing in your hands to unroll.
- Backwards stroking of the hands over the rump of the hedgehog to encourage unrolling.
- Holding the hedgehog facing downwards by the hind limbs, supporting the dorsal surface and encouraging the hedgehog to uncurl. This method may not always work in an active or stressed hedgehog but may be more suitable for those that will not survive a general anaesthetic.

An important condition to note is 'capture myopathy'. This is commonly seen in deer but any wild species can suffer from it. It is a condition where the body responds to increased stress, causing hyperthermia, ataxia, muscle weakness, and renal and cardiac complications (Green, 2003). Capture myopathy can become life-threatening so efficient handling, use of stress-reducing techniques, an appropriate environment and grouped clinical procedures are highly recommended (Vickery, 2020).

Anaesthesia and analgesia

Anaesthesia is indicated if it is not possible to handle the hedgehog consciously, or for further diagnostics or surgical intervention. Radiography or blood collection and analysis often need to be performed under anaesthesia to aid diagnosis. The use of heavy sedation via subcutaneous injection could be considered in some cases, but care must be taken with those displaying respiratory issues (MSD, 2021). Inhalation anaesthesia via a chamber is recommended for hedgehogs, as intravenous access can be difficult to achieve (Collins, 2004). Once the hedgehog is sufficiently anaesthetised, maintenance with a face mask or endotracheal tube is recommended. Endotracheal intubation is possible using an uncuffed 2–3.5 mm tube (Carpenter, 2005). Anaesthetic monitoring in hedgehogs is similar to the method used for dogs and cats, and care should be taken to maintain body temperature and hydration status.

Any wildlife presenting in a veterinary practice must receive appropriate treatment to relieve suffering, which includes the provision of pain relief. Hand (2021) suggests the following analgesic options for hedgehogs:

- Buprenorphine 0.02–0.05 mg/kg sc q8h (moderate/severe pain)
- Carprofen 5–10 mg/kg sc q24h, orally q12h (analgesic and anti-inflammatory)
- Meloxicam 0.5 mg/kg sc, orally q24h (analgesic and anti-inflammatory)

Notably, meloxicam and carprofen are often delivered by subcutaneous injection or orally. To administer subcutaneous injections, lift a small fold of skin over the back or flank by pulling gently on the spines and inject under the skin (McClure, 2011). Intramuscular injections can be given into the quadriceps at the front of the thigh.

First aid

There are several reasons a hedgehog may present in veterinary practice that warrant first aid, including:

- Skin wounds (and secondary myiasis)
- Road traffic injuries, including limb fractures, nasal trauma and jaw fractures
- Entrapment
- Subcutaneous emphysema (balloon syndrome)
- Burns due to bonfires
- Poisoning (as with domestic pets)
- Excessive tick and parasite infestation (indicating underlying disease)



First aid is defined as the immediate treatment of injured animals or those suffering from sudden illness, with a view to preventing the worsening of disease or death (Dallas, 2007). The RCVS Code of Professional Conduct states that the primary consideration of the VS should be to relieve the animal's pain and suffering, and RVNs must take steps to provide emergency first aid (RCVS, 2016). Analgesia is often one of the primary priorities; hedgehogs are good at disguising pain in order to protect themselves from predators (Williams, 2010). Three common life-threatening conditions in hedgehogs are hypothermia, dehydration and myiasis (fly strike). Many hedgehogs presenting in practice will benefit from the immediate provision of warmth and fluid therapy. In severely shocked hedgehogs, further procedures such as diagnostic tests or surgical intervention should be delayed until the animal is stabilised (Bexton, 2017). Active warming is indicated for hypothermic hedgehogs; heat can be provided with warm air incubators, heat

pads or warm air blankets – ensure the hedgehog can escape the heat source at all times.

Dehydration can be detected by testing the skin turgor along the dorsum and by the appearance of sunken eyes. Subcutaneous fluid administration is the most effective means of rehydration in hedgehogs, as intravenous access can be difficult to maintain. Bexton (2017) advises that large volumes of fluid can be given at multiple sites to aid absorption; warmed crystalloid fluids with the addition of hyaluronidase can improve uptake. In severe cases, where rapid fluid absorption is essential, warmed fluids can be given intraosseously or intraperitoneally (Bexton, 2017). Mullineaux and Keeble (2017) noted that an initial emergency resuscitation rate of 20 ml/kg can be given to hedgehogs subcutaneously in the 'skirt' area.

Myiasis, or fly strike, is common in hedgehogs, especially in warmer weather, and is more likely to occur in weak or debilitated hedgehogs. A thorough examination for the presence of fly eggs and maggots is essential, as myiasis can cause considerable tissue damage, toxicity and rapid death (Bexton, 2017). Treatment of myiasis includes brushing the clumps of fly eggs away (with a toothbrush or by clipping fur) or manual removal of maggots with forceps. Topical spot-on preparations or injectable ivermectin are effective insecticides for any undiscovered maggots (Williams, 2010). Most cases of myiasis will need additional fluid therapy, active warming, and antibiotic and non-steroid therapy for the anti-toxic and analgesic effects (Bexton, 2017). Advanced stages of myiasis, especially secondary cutaneous myiasis associated with wounds, will necessitate euthanasia due to debilitation and extensive pain.

Wild hedgehogs carry a wide variety of other ectoparasites and endoparasites, often with high burdens. The presence of some ectoparasites such as ticks is normal, but high levels of parasites could indicate debilitation and should be considered in first aid. A high morbidity rate is associated with high levels of infection, especially with lungworm – dyspnoea, weight loss, lethargy, ataxia and even death can occur in a weak hedgehog (Wright, 2014). Flea and worm treatment should be considered for all hedgehogs that will stay in veterinary practice, as they carry a risk to the domestic in-patients and a zoonotic risk to staff.

The most common endoparasite of concern in hedgehogs is lungworm (*Crenosoma striatum* or *Capillaria aerophila*), which often presents with a moist cough in infected individuals. Faecal screening is recommended for diagnosis, though prophylactic treatment can be considered in autumn and winter months or among juvenile hedgehogs. Concurrent antibiotic therapy and anti-inflammatories are often indicated in cases of lungworm, due to secondary respiratory infections (Hand, 2020).



Orphaned hoglets

Occasionally, orphaned hoglets may be brought into the veterinary practice. This is usually in May, June and July, when first litters are born, then in August and September when the second litters are born. The average litter size is four to five hoglets. Hoglets are usually made orphans when their mothers are killed in road traffic accidents or if the mother has been disturbed and deserts the hoglets shortly after birth. Care should be taken not to disturb hoglets unnecessarily and clients should be advised to monitor nests from a distance, unless the hoglets are seen out in the day without an adult and are distressed and squawking. Orphaned hoglets can be hand-reared by members of the veterinary team, who can share the hand-rearing responsibilities, including feeding, toileting and providing fluids and warmth (Bullen, 2014). The ultimate aim of rearing hoglets is to rehabilitate them; they must not become too familiar with humans or they will not survive in the wild. The British Hedgehog Preservation Society has a thorough guide on caring for hoglets, although rehabilitation with an experienced wildlife centre may be more suitable.

Hospitalisation

Hedgehogs may need to be temporarily housed in the veterinary practice. As with other prey species, measures should be taken to reduce stress. Hedgehogs should be housed away from predators to reduce the stress to them and other patients in the ward (Vickery, 2020). Humans are also predators, so care should be taken not to house them in a busy environment (Stocker, 2005). Suitable accommodation should be provided, such as a nest box and shredded paper, as well as ensuring behavioural needs are met. It is important to remember that hedgehogs are naturally

nocturnal animals and should be allowed to rest during the day when possible. Reducing stress levels for hedgehogs should be considered throughout the hospitalisation period and hedgehogs should be released or rehabilitated as soon as possible (Williams, 2014).

An appropriate feeding regimen should also be established, and their natural dietary requirements considered. The ideal diet during hospitalisation is a commercially prepared hedgehog food. However, this might not always be available, so a high-quality cat or dog food can be provided instead. Milk should be avoided as hedgehogs are unable to digest lactose. Inappetent hedgehogs can be syringe-fed with a recovery diet such as Hill's a/d or Liquivite (McClure, 2011). Regular weight checks are recommended as an indication of the hedgehog's health and for accurate drug dosing.

Veterinary staff may have a predisposition to 'feed up' debilitated or underweight animals; this should be avoided in hospitalised hedgehogs to reduce the risk of re-feeding syndrome. Re-feeding syndrome is a condition that refers to a potentially fatal metabolic derangement that occurs after feeding a patient that has had an extended period of complete anorexia or severe malnutrition (Chan, 2015). Therefore, the successful management and re-feeding of a debilitated hedgehog with a probable history of starvation involves careful use of fluid therapy, monitoring of electrolytes (if possible) and conservative nutritional therapy. Supported or syringe feeding may be necessary for debilitated hedgehogs. It can be beneficial to use a small pipette tip on the end of a syringe to aid feeding (Vickery & Hollwarth, 2021).



Release or rehabilitation

Hedgehogs should be released in the area they were found, or rehabilitated as soon as possible, as a veterinary practice is inherently stressful for them. During the breeding season, adult females without injury should be returned swiftly as they may be nursing hoglets. It is usually possible to release hedgehogs over the winter months, as long as weather conditions are mild and the hedgehog is of suitable body weight (Mullineaux, 2017). A recent study by Lukesova et al. (2021) found the greatest chance of release was seen in hedgehogs with a weight on admission of 500–599 g (65% released) or 400–499 g (63% released). The smallest number of young hedgehogs successfully rehabilitated and released was seen in hoglets weighing 200–299 g (35% released). For this reason, it is essential to obtain a hedgehog's weight on admission and monitor it carefully throughout the stay in practice and during rehabilitation. Veterinary practices should have close working relationships with local wildlife centres as they will often be able to provide advice on release, and rehabilitate hedgehogs if needed (Mullineaux, 2016). More information on hedgehog rehabilitators can be found on the British Hedgehog Society's website. Information for the general public can be found on various websites (see Support links) and could be displayed in the veterinary practice reception. Some general advice could include:

- Advice on weighing hedgehogs
- Images of 'normal' and underweight hedgehogs
- Advice on ataxia and weakness, which often requires veterinary attention
- Advice on injuries that require veterinary attention
- 'Out during the day' information – this can be a sign that a hedgehog needs help, though autumn juveniles and nursing mothers often forage in daylight hours.

Conclusion

Wild hedgehogs present in veterinary practice for a variety of reasons, including road traffic injuries, wounds, myiasis, entrapment, burns and poisoning. Their numbers are also declining in the UK due to an increase in road traffic, climate change, agricultural intensification and predators. Sometimes hedgehogs present without injury due to lack of public knowledge, so time should be taken to thoroughly assess, treat and release or rehabilitate hedgehogs when possible, and to assist wildlife centres in public education. Veterinary professionals are responsible for the appropriate treatment of wild hedgehogs presenting in veterinary practice and should be aware of how to perform appropriate triage, first aid and basic care while considering the overall outcome for the patient.

Support links

www.britishhedgehogs.org.uk

www.legislation.gov.uk/ukpga/2006/45/contents

www.wildlifetrusts.org/what-do-if-you-find-wild-animal/help-hedgehog

www.rspca.org.uk/adviceandwelfare/wildlife/animals/hedgehogs/garden

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Reflective professional development notes. To access hyperlinks to the references and support links, scan the QR code on page 3.