Hedgehog Helpline

A Brief Guide to Hedgehog Care For Veterinary Surgeons

Initial Stabilisation and Assessment Including Common Conditions

Hedgehog Helpline

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Please remember to scan for an identity chip **PAGE**

1. Initial Care - General

THE AIM IS TO RETURN THEM TO THE WILD

Hedgehogs are now on the IUCN Red List as vulnerable to extinction in Great Britain.

Remember 3 things:

1. Warmth
2. Fluids
3. Minimise stress

Please remember to scan for an identity chip

- General anaesthetic is a great aid to fully assess a hedgehog, but we generally recommend **stabilising with fluids**, analgesics such as Metacam (given an hour after fluids) or Buprenorphine.
- If appropriate, try to wait for 12-24 hours after admission and stabilisation before general anaesthetic is administered. Exceptions: **"Pop Off" Syndrome**, where it is essential to restore the natural ability to ball up *as* **soon as possible** thus GA is required, or if there is the chance that injury is such that the hedgehog will probably require euthanasia. Fresh wounds which may benefit from immediate cleaning and suturing is another example. Thereafter, administer fluids, analgesia etc.

WARMTH:

- Providing warmth using hot water bottles, heat mats etc. is important and bedding such as shredded paper, towels are most appropriate.
- Light coloured towels are a good idea as they will show any blood, discharges etc.
- Once warming has begun, fluids can be administered. Do not use fluids until the hedgehog is warm otherwise warmed subcutaneous fluids will not be absorbed quickly enough and will become a cold pool drawing heat from the patient.

FLUIDS:

- It is safe to assume that any hedgehog is at least **10% dehydrated on admission,** so giving this in 2-3 doses over a 24-hour period is a good idea.
- Additionally, the normal maintenance of 5% per 24 hours e.g. 500g hedgehog will require 50ml plus 25ml over the first 24 hours (total 75ml in 2-3 doses).
- If the hedgehog is in **severe shock** and **collapsed**, you can give the 10% in one go and follow up with more (including maintenance) the same day. **BUT** ensure that warming is in progress.

MINIMISE STRESS:

- **Avoid stroking, talking to and petting them** - all are stressful to them.
- Hedgehogs harbour many parasites (see Appendix 2) and while they are healthy and in the wild, they cope with them. Unfortunately, when injured, stressed or admitted into care, their immunity is compromised and often these parasites will become a problem - therefore, **faecal sampling is an essential part of hedgehog care and rehabilitation.**

- A hedgehog that is found out in day but eating and drinking should have a faecal screening on admission, to establish if it is fit for release. It will also require warmth and fluids as hedgehogs dehydrate rapidly.

GENERAL ANAESTHETIC

- General anaesthetic is done by "gassing them down" using Isoflurane / Sevoflurane at 3% to 4% and oxygen, and often needs to be kept at that level to maintain analgesia but once under it can be reduced to 2%.
- Try use a mask directly over their nose and mouth rather than a chamber as this irritates the eyes and makes it easier to monitor the depth of anaesthesia.

GENERAL EXAMINATION

It can be difficult to open hedgehogs up, but it can be done so by **gently rocking them back and forth** while holding both sides. If you cannot open it up, don't force it or anaesthetise it, rather obey the principles of warmth and fluids and assess later once stable (at this point anaesthetic could be used).

A clear container and a mirror are handy to help observe the underside of a hedgehog when assessing it. If the hedgehog will walk around, try it in a quiet area on a towel and observe its breathing and motility. Undertake clinical examination to check the eyes, any nasal discharges, increased or abnormal respiratory sounds, limbs etc.

ALWAYS collect a faecal sample to examine it yourself or pass it onto a **Hedgehog Helpline** carer to examine.

X-rays are extremely useful if anaesthetised and remember to do orthogonal views of the whole hedgehog. Area specific x-rays can be done if required.

Female hedgehogs may be pregnant even over the winter, so it is a good idea to scan as we have diagnosed pregnancy in late December. This can be done conscious and without clipping, just use a large amount of gel on the probe and place on their abdomen like an ice-cream cone. Pregnant females need to be cared for differently and need as little intervention as possible as otherwise they may abort.

CARING GUIDELINES

Weigh the hedgehog - <u>Always wear gloves</u>

IF LESS THAN 200G go straight to "Emergency Care of Hoglets" (Page 7)

IF MORE THAN 200G

1. Place on a covered heat-pad at around 30 degrees; ensure that hog can move off heat pad if it wants.
2. Give 10% of the hog's bodyweight (100ml/kg) in warm s/c fluid either as a one off or in divided doses along with maintenance fluid (see above). The procedure is similar to that for domestic animals: using forceps or, if the hog is limp, using the index finger and thumb, grasp several spines and raise a 'tent' of skin. Insert the tip of the needle into the base of the tented area. Preferred s/c locations are **shoulder** and **on each side.** Warmed normal saline or Hartmann's are both appropriate. Fluids can be given repeatedly twice daily as required at a similar dose or tapered down to a maintenance dose of 50ml/kg daily as they proceed to improve. **REMEMBER THE HEDGEHOG MUST BE WARMED BEFORE GIVING FLUIDS.**
3. Check for obvious wounds and injuries. Use smell as an indicator. Check for fly strike.
4. Entrapment and constriction injuries must be put on Synulox for 7 days and the area monitored as they may slough up to 7 days after the injury.
5. If no wounds or injuries are apparent contact **Hedgehog Helpline** on **07557 646773**
6. If there are serious injuries and euthanasia is a potential option please refer to Appendix 1 (Page 9).

In the event that there is no one from **Hedgehog Helpline** available to collect the hog immediately, please follow the guidelines below:

7. If there are open wounds, flush with Hartmann's or saline and start treatment with broad spectrum antibiotic such as Noroclav or Synulox. If maggots are present, irrigate with saline solution to remove maggots then spray with F10 to kill any remaining maggots or fly strike. The eggs can be removed using a mascara brush or a gentle suction device.
8. If the hedgehog is "inflated" (**Balloon Syndrome**) which can be caused by an injury either to the airways or occasionally by a subcutaneous bacterial infection, a number of needles can be inserted to relieve the pressure. As there may be an injury, use 7 days of Synulox and repeated deflating as required.
9. Make a note of any treatment given so that the Hedgehog Helpline carer will not duplicate treatment.

10. **Provide cover** in the cage e.g. nest box with nesting materials or large towel to enable the hedgehog to hide, thereby minimising stress.
11. **Avoid** implementing any worming, mite or ringworm treatment for **at least 24 hours** or until stabilised. Ticks - if excessive in number - should be removed using a tick remover. **DO NOT USE FRONTLINE**
12. **Work quietly** as our voices will stress them.
13. **Blindness** is often difficult to diagnose and may take a few days to assess by observation and until they are stabilised. They may be wandering around during the day and not at night. However, in a severely dehydrated hog the eyes are so sunken they may not be obvious.
14. Remember that hyperactive hedgehogs that cannot settle may have **Fluke.**
15. **Pop-off Syndrome** is where the hedgehog's encircling muscle (*orbicularis panniculi*) pops off and causes the spines to contract in a ball above the spine, rendering the hog incapable of movement. Immediate GA and re-establishing the correct position is essential, followed up with fluids and analgesia.
16. **Limb injuries** are common and can be treated successfully provided this is done as soon as possible. Our vet has significant experience in this area and he can be contacted for advice and/or the hedgehog referred onto him.
17. **Neurological conditions** are often seen and range from head tilts to paralysis of hind quarters. This is where x-rays of the spine and skull are useful. Some will make a full recovery from a head injury and we would usually give them up to 2 weeks.

Please note that **Frontline should be avoided** as it is toxic to hedgehogs.

FAECAL SAMPLE

- **To identify parasites** please collect a faecal sample and/or make a faecal smear where possible: mix a small amount of faeces with saline/Hartmann's and cover with a cover slip. This will be useful for both the **Hedgehog Helpline** carer and yourselves in targeting the correct treatment.
- See Appendix 2 (Page 13) for common hedgehog parasites, presentation, symptoms and treatment.

2. Emergency Care of Hoglets

IF THEY ARE LESS THAN 200G

- Hoglets are a specialised area and have vastly different emergency care needs to those of adults.

General Guide:

- Hoglets with **eyes closed are formula dependent and should be nursed in an incubator or similar.**
- Hoglets with **eyes open but have no or very small teeth are also formula dependent.**
- **Hedgehog Helpline** will prioritise admission of formula dependent hoglets. However, there are only a few suitably equipped carers across South Wales, so please contact us as soon as they are admitted and we will endeavour to take them in.
- If possible, obtain history and contact details. It may be possible to reunite with mum or locate other siblings. See points 12 and 13 below.

INITIAL CARE

Weigh the hedgehog – for hedgehogs over 200g and adults see **Page 5** above.

1. If completely collapsed give 10% of the hog's bodyweight in warm sub cut fluids immediately.
2. Check for obvious wounds and injuries.
3. Place on a covered heat pad at around 30 degrees and use a soft covering over the hoglet.
4. Toilet the hoglet if required – this is age dependent. As a rough guide, if it has teeth it should not need toileting. If the eyes are closed it will need toileting; anything in between will probably need toileting. Please refer to Appendix 4 on Page 20 (Guidance on Ageing Hoglets) or contact **Hedgehog Helpline**. When in doubt, best to toilet. Ideally use some baby oil to the cotton bud when toileting.
5. If no wounds or injuries are apparent, contact **Hedgehog Helpline**.
6. If there are serious injuries and euthanasia may be an option (please refer to Appendix 1, Page 9).

In the event that there is no one from **Hedgehog Helpline** available to collect the hog immediately, please follow the guidelines below:

7. If **open wounds** are present, irrigate and start treatment with broad spectrum antibiotic Synulox at a dosage of 0.7ml/kg of bodyweight. Oral is usually easier with hoglets, as the consistency of the s/c solution makes injecting difficult, but only once fully conscious and rehydrated and able to swallow.

8. **Remove flystrike:** Remove manually with tweezers or mascara or toothbrush; chemicals are best **not** used on hoglets. Remove maggots: Use tweezers or gently irrigate. Again, chemicals are best not used.
9. Do not attempt to feed until fully warmed, rehydrated and accurately aged.
10. Make a note of any treatment given so that the **Hedgehog Helpline** carer will not duplicate treatment.
11. Call **Hedgehog Helpline** who will send a local carer to collect the hoglet as soon as possible.
12. Is there possibility of mum? If the nest was disturbed, advise finders to look out for mum. If they have brought her in, house her with hoglets in a very quiet area and do not disturb where possible.
13. Are there any siblings? If mum has abandoned or is dead, hoglets will move out from nest and may be found in the area over several days. Please be aware of this and ask the member of the public to keep a look out.

The British Hedgehog Preservation Society makes the following document available on their website, to aid veterinarians and experienced hedgehog carers only: www.britishhedgehogs.org.uk/caring-for-hoglets

This document is intended as a basic guide only and it is entirely based on our policies and experience at Hedgehog Helpline. Opinions may differ and we welcome comments and discussions.

Drug dosages are based on Hedgehog Helpline's experience of what it has found to work. Hedgehog Helpline will not be responsible for any possible adverse reactions or side effects.

We are not able to cover the full scope of possibilities in this document and if you require advice or encounter a problem we have not covered, please email **Hedgehog Helpline** or visit our website.

contact@hedgehoghelpline.co.uk
www.hedgehoghelpline.co.uk

If you would prefer to speak directly to a Veterinarian, our Vet at Bridge Vets may have limited time to answer an urgent query or will refer you to a Primary Carer / Trustee.

Appendix 1: Hedgehog Helpline Policy on Euthanasia and Release

This policy has been put together to give our carers guidance on when hedgehogs brought to them should be put to sleep or treated. It is based on many years of experience and will be amended as we learn more about the treatment and outcomes of those treatments. The Trustees are happy to discuss this policy with anyone interested in knowing how it was developed.

Decisions will take into account the patient's welfare, its bodily condition and whether treatment may involve difficult procedures with a probable poor outcome.

Remember, our aim is to rehabilitate hedgehogs back into the wild and if we cannot do so, then euthanasia is sadly the most humane solution. It also frees up room to take in others that may benefit from treatment.

EUTHANASIA

In the following situations the hedgehogs will be put to sleep ASAP:

1. Hedgehogs with more than one major injury.
2. Hedgehog with serious burns.
3. Hedgehogs with a major nose or jaw injury.
4. Hedgehogs that need to have a limb amputated if it cannot be saved - usually due to concomitant infection or multiple fractures in the limb. This has actually led to us saving more limbs as we now have gained more experience in managing fractures etc. A hedgehog cannot live without its front limb as it needs to scavenge for food. They can survive without a back leg but are unable to groom and we often find they have ear infections on the same side.
5. Tiny Timothy / Clangers – hedgehogs with small bodies and large heads, these are often fully developed hedgehogs but may weigh less than 100g.
6. Elderly hedgehogs that require prolonged, painful treatments and have very few or rotten teeth.
7. Permanently blind hedgehogs - but this requires a few days of observation to be certain. However, it may be possible to keep a young healthy blind female hedgehog in a suitable, secure supervised garden so that with the introduction of a male at a suitable time, she may produce a litter of hoglets which can be released into the wild when old enough. This is a debatable and controversial policy. The female may not be as stressed being in a confined area, but a male almost certainly would.

8. New-born hoglets usually less than 48hrs old (before the spines have emerged) where it is known that the mother is dead. We are having some limited success with them so please call us to discuss.

In the following situations hedgehogs may be put to sleep after a more detailed examination or a short treatment. The following will be reassessed on a daily basis until it is decided to put to sleep or set a longer "decision" time. Decision / reassessments should not exceed 10 to 14 days:

- **Head traumas** need to be monitored to see whether the hedgehog is blind, brain damaged or has injuries to the sinus areas. Those that have evidence of brain trauma – commonly seen as head tilt / circling (vestibular symptoms) should be cared for for 2 weeks during which time we expect to see an improvement. (Ensure that they don't have an ear infection.)

- **Injuries to the head** are often associated with damage to the nose and/or sinuses this can be very serious as hedgehogs rely on their noses to find food and navigate. If this cannot be treated (which will often result in recurrent infections) then euthanasia may be required.

- **New-born hoglets** with only white prickles, where the mother may still be around, will be kept for 2 nights in the hope that mother will be found and can be reunited. After 2 nights a decision will be made, based on their progress, on whether to continue with rearing or whether to put to sleep. This must be under the advice and preferably the care of a hoglet 'specialist'.

Those that with treatment may still need to be put to sleep:

- Those that may recover with sympathetic treatment will be re-assessed daily for up to 14 days, when either a decision will made to put to sleep or to continue with further treatment.

- Should the patient deteriorate, then a decision to put to sleep would be made earlier.

- If the patient shows great stress, anxiety or distress whilst undergoing its treatment then a decision to euthanise would also be made earlier. This also applies when any are released into enclosed gardens.

- If the patient does not thrive or does not respond to treatment, then a decision will be needed on whether to try further treatments or put to sleep.

MONITORING

If we are undecided about whether to treat some of the above instances, we will keep a record of the ratio between those successfully released, those that die during treatment and those that are put to sleep after initial treatment. We will also discuss the issue with other experienced rehabilitators to see how they deal with such cases and why.

RELEASE POLICY

If we consider that a hedgehog has an equal chance of survival in the wild as its wild counterparts then it will be released following our release guidelines. Albino and oddly coloured hedgehogs will be released if fit and healthy.

While it is not our policy to keep permanently disabled hedgehogs, even in a secure garden, we may keep healthy blind females to use in a captive breeding situation provided they are not distressed or suffering in any way. (See above).

RELEASE GUIDELINES

Hedgehog rehabilitators consider that it is best for the hedgehog if it is returned to the location where it was found. Sometimes the place where it was found is the reason for the problem in the first place, so take this into consideration before releasing.

Should we release into a nest box?

- From observations of hedgehog nests in the wild over many years, we have found that as long as a nest is occupied it will remain dry and secure even in awful weather conditions, but once the hedgehog is away from the nest (even for a couple of days), the nest will quickly turn into a sodden mess, meaning that any hog returned to the area will have to start their nest from scratch.
- As a result of this observation, we prefer to release into a nest box - either a permanent or a temporary box. The hedgehog may stay only one night, but at least it has something.
- We do supply sturdy, waterproof release boxes at a reasonable charge to help raise funds for the Charity, please contact us if you are interested in purchasing one.
- Do not release when it is raining or when a wet period is predicted, wait for a dry spell.

Hedgehog Helpline has a register of **release sites** in South East Wales, all of them have nest boxes and have been used successfully for many years.

HOGLET RELEASE

- Hoglets that are brought in to us have no knowledge of where they came from so we have a lot more leeway about where to release.

- When they are 5-6 weeks old they can as a litter go into a garden pen to acclimatise, and human contact can be limited to observation and placing of food. They all have different rates of development, some are ready for a soft release after a couple of days and some may take a few weeks.

- **Soft Release:** After the youngsters have spent some time in a garden run, the litter or group can go for a soft release into a wild environment: this will be a nest box in an open garden; food can be provided in a feeding station for as long as they need it; some may disappear within hours, some may stay for a long time.

We very often have hedgehogs brought in to us in the misguided belief that as they have been found, for example at 11pm in a garden flower bed, then they must be in trouble. If this happens they should be returned as soon as possible to where they were found as it's always possible that it's a female with a nest of babies nearby.

Appendix 2: Common Hedgehog Parasites (Presentation and Treatment)

- **AVOID** implementing any worming, mite or ringworm treatment for at least 24 hours or until stabilised.
- As worming can be a severe shock to the hedgehog, we **recommend giving fluids just prior to the medication** and for 2 days afterwards.
- **Please Note**: Frontline should be avoided as it is toxic to hedgehogs.

LUNGWORM / INTESTINAL WORM

- The hedgehog will often present no outward symptoms of even severe infestations.
- Common symptoms of a heavy worm burden are coughing and/ or sneezing.
- Diagnosis is by faecal sample under the microscope.
- Typically you will see a well-rounded egg (*Capillaria aerophila*) or a longer, narrower, symmetrical egg (*Capillaria ovoreticulata*) with a 'pole' or cap at either end and Capillaria erinaceid:
  - Treatment for this is with Ivermectin (see below).

Capillaria aerophila *(Lungworm)*

Occasionally covering antibiotics will be used if we feel that there is a secondary infection.

- The other lungworm is *Crenosoma striatum*, sometimes seen as eggs or living worms:
  - This is a common parasite and can cause coughing and severe respiratory compromise.
  - Treatment is with Advocate (see below) at 0.4ml/kg on the skin in the axilla (thinner than the back) once off and there appears to be no recurrence for up to 3 weeks. It can be repeated after 2 weeks if required. Do not inject it!
  - If the hog is in respiratory distress, then Dexamethasone (2mg/ml) is given for 3 days at 0.5ml/kg.

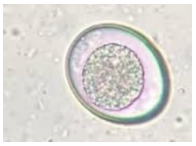
Capillaria ovoreticulata *(Intestinal worm)*

Crenosoma striatum

COCCIDIOSIS

- The hedgehog will often present no outward symptoms of Coccidiosis, but the condition is fatal if left untreated, especially in young hedgehogs.
- Hedgehogs with Coccidiosis will often show no interest in food, despite being very thin, and will not thrive or gain weight.
- It is also common to see blood in the faeces. A faecal smear on a slide will show oocysts. [However these can be difficult to see due to their size].
- There are two stages in the development of the oocyst – sporulated and unsporulated – shown right.
- In both cases, when viewed under the microscope, the distinctive pink ring can be seen when adjusting the focus.
- Treatment is Trimacare or Tribrissen (24%) at the dosage of 0.6ml/kg for 10 days but this can be difficult to obtain so we now use **Baycox** 5% solution at 2ml/kg orally every 10 days.

Unsporulated



Sporulated

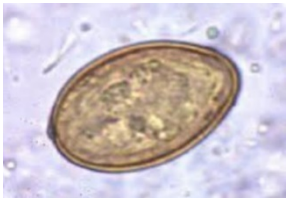
GIARDIA

- Can occasionally be found in the faecal sample and treated with Metronidazole/Eradia orally (see below).

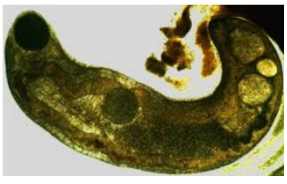
FLUKE

- Hedgehogs with Fluke will often present with manic behaviour. They will run around, desperately trying to escape any enclosure before collapsing.
- Fluke eggs can be identified from a faecal sample, though the eggs are not always present in any great numbers.
- The Fluke egg is distinguished from the Capillaria by the asymmetrical shape and the lack of caps, at both ends. They are about ⅓ the size of Capillaria eggs.
- When the infection is severe, adult fluke may be found in the faeces, and can be seen with the naked eye.
- Treatment for Fluke is with Profender Cat – 0.5mls/kg body weight, given as 3 doses on underbelly skin at 7 day intervals. (We have found more success by injecting it subcutaneously but it must be given fluids before and for at least one day after as they can become inappetent.)
- Dexamethasone may prove useful in the initial stages.

Fluke Egg
1/3 the size of Capillaria eggs



Adult Fluke



THORNY HEADED WORM

- It is unclear whether this causes illness or not but it is sometimes found in the faecal sample.
- As it has the potential to migrate through the gut wall, it could be highly destructive and painful so we therefore treat it with Profender (Praziquantal), 0.5ml/kg bodyweight.

RINGWORM (ZOONOTIC)

- A hedgehog with ringworm may present with mild or severe symptoms.
- In mild cases, the skin will be grey and flaky; the hedgehog will scratch a lot and will shed spines when handled. Underbelly fur and fur on legs may be absent.
- In severe cases, the skin may be fully crusted with scabs which will need to be removed before the skin can heal.
- Scabs will be predominantly on the face and ears with dry flaky skin more in evidence around the skirt (where the spines meet the fur on the flanks).
- In moderate cases, the scabs can be painted with almond, coconut or olive oil to soften them enough to be gently removed.
- In severe cases, the animal should be gassed down so that the scabs can be removed with minimal pain. Where the removal of the scabs results in raw wounds, antibiotic cover should be provided with Synulox at the dosage of 0.7ml/kg bodyweight for 7 days.
- In all cases the hedgehog should be treated with a 1:50 solution of Imaverol to tepid/ warm water. This can be applied to the skin in a spray or the hedgehog can be partly immersed in a warm Imaverol bath, and the other areas done by syringing the solution over the skin. The face and nose area should be done with a cotton bud, dipped in the same Imaverol solution. Care should be taken to avoid the eyes.
- Mixing 5mls **Imaverol** in 250ml of water in a spray bottle will last for 6 weeks and can be sprayed on every other day for 2 weeks (7 treatments).

MITES - CAPARINIA TRIPILIS

- Can be confused with ringworm and many have mites alongside ringworm and appear like dust.
- Treat with Ivermectin at 0.5ml/kg s/c or Advocate (0.4ml/kg) on skin in the axilla.

TICKS

- Common parasite can be removed or treated with **Ivomec**.

FLY STRIKE

- Clean them away using a flush of warm fluids such as Hartman's or saline, a mascara brush and spraying F10 insecticidal wound spray.

WOUNDS

- Generally we use Synulox but add Metronidazole in severe infections such as Eradia (0.3ml/kg orally for 5 days).

Appendix 3: Drugs Commonly Used by Hedgehog Helpline

ADVOCATE DOG	Moxidectin and Imidacloprid	Crenosoma (lungworm) and skin mites. May help for some round worms.	0.4ml/kg on the skin of the armpit every 3 weeks
BAYCOX	Toltrazuril (50mg/ml oral suspension)	Coccidiosis treatment	Dose Rate: 100mg/kg orally once, then repeat after 10 days **= 2ml/kg orally**
BISOLVON	Bromhexine	Bronchodilator and Mucolytic injectable and oral preparations **Use with treatments for heavy Crenosoma (lungworm) burdens**	Dose Rate: 3mg/kg daily. Therefore: **3mg/ml injection** = 1ml/kg daily i/m or s/c for 7-10 days, **10mg/gm powder** = 0.3gm/kg daily orally for 7-10 days
CLAMOXYL LA	Amoxycillin LA (150mg/ml)	Antibiotic injectable	Dose Rate: 100mg/kg Therefore, 0.7ml/kg bodyweight i/m or s/c **every other day**
DEXADRESON, COLVASONE	Dexamethasone (2mgs/ml)	Corticosteroid, anti-inflammatory injectable (i/m, s/c or i/v) and oral preparations	**Inflammation**: 1mg/kg = 0.5ml/kg, **Shock**: 5mg/kg (2.5ml/kg) **Head or Spinal Trauma**: 5mg/kg initially (2.5ml/kg), then 2mg/kg (1ml/kg) s/c twice a day
ENGEMYCIN	Oxytetracycline	Antibiotic injectable and oral preparations	Dose Rate: 50mg/kg twice daily for 7 days. Therefore: **50mg/ml injectable** = 1ml/kg twice daily i/m or s/c for 7 days, **50mg tablets** = 1 tablet/kg twice daily orally for 7 days, **100mg tablets** = half a tablet/kg twice daily orally for 7 days
FEROGLOBIN	Ferric Ammonium Citrate, Folic Acid, Cyanocobalamin	Multivitamin and iron supplement For coccidia	Small amount added to food or given orally. Generally they develop a pica and will take it if required
IMAVEROL	Enilconazole	Antifungal	Mix 1:50 with water e.g. 5ml Imaverol to 250ml water (or 1ml Imaverol to 50ml water). Spray well and allow to ‘drip dry’. Spray every 3 days until the hog has had 4 sprays. Can spray with Vetricyn in-between. Keep in warm during treatment. Mixture will keep for 6 weeks. Small handheld houseplant sprayers are ideal for this

ITRAFUNGOL	Itraconazole (1% = 10mg/ml)	Antifungal	1.5ml/kg daily orally for 7 days, repeat after a 7 day break
ISATHAL EYE OINTMENT	Fucidic acid	Eye ointment	Twice daily for a minimum of 5 days
IVOMEC, PANOMEC	Ivermectin (1% = 10mg/ml)	Wormer / Parasites (not tapeworms) **Use if** Capillaria eggs found in faecal sample	0.5ml/kg - 3 inj, s/c each 1 week apart **Mites:** 1-3 drops dep. on size directly onto skin on back of neck
MARBOCYL 2%	Marbofloxacin	Antibiotic - Recommended antibiotic with worming treatments	Dose Rate: 8mg/kg daily for at least 7 days. 2% injectable = 0.4ml/kg daily s/c for at least 7 days
METACAM / LOXICOM	Meloxicam	Analgesic / Anti-inflammatory injectable and oral preparations	Dose Rate: 0.5mg/kg for up to 3 days. Therefore: 5mg/ml injection = 0.1ml/kg daily s/c for up to 3 days, 0.5mg/ml oral = 1ml/kg daily for up to 3 days, 1.5mg/ml oral = 0.35ml/kg daily for up to 3 days
METRONIDAZOLE	Metronidazole	Antibacterial / Antiprotozoal injectable and oral preparations	Dose Rate: 40mg/kg daily for 5-10 days. Therefore: 5mg/ml injectable = 8ml/kg daily s/c or i/v for 5-10 days, 200mg tablets = one fifth of a tablet/kg daily orally for 5-10 days, 40mg oral solution = 1ml/kg daily for 5-10 days
PROFENDER	Praziquantel and Emodepside	Wormer (tapeworms), Flukicide injectable and oral preparations	**Profender Spot-on (cat)** = 0.5ml/kg on underbelly skin 3 doses (occ. 4 doses necessary), each 7 days apart
SYNULOX / NOROCLAV	Amoxicillin / Clavulanate	Antibiotic injectable and oral preparations	Dose rate: 100mg/kg daily (for injectable for at least 7 days Therefore: 175mg/ml injectable = 0.7ml/kg daily s/c for 7 days, 50mg tablets = 2 tablets/kg twice daily for 7 days orally, palatable drops = 2ml/kg twice daily for 7 days orally
TRIBRISSEN / NORODINE	Trimethoprim / Sulphonamide	Antibiotic	**24% injection** = 0.5ml/kg daily s/c, Daily for 7 days

VETAMIN POWDER	Zinc and Multivitamins	Supplement	Used to help spine growth especially in ringworm. Sprinkle on food for 2-4 weeks
VITAMIN B12		Debilitated hedgehogs, ongoing gastro intestinal illness and appetite booster	Generally used in all hogs on admission then continued weekly while undergoing treatment Dose: 0.2-0.5ml/kg weekly or occasionally daily

i/m = intramuscular
s/c = subcutaneous
i/v = intravenous

Oral preparations can often be mixed with a small amount of food. However, injectable options are recommended whenever possible as under dosing with oral medications is common.

Note:

- Listed medications are not under manufacturers' guidance for hedgehogs.
- The drug dosages above are guidance only and have been prescribed by the Hedgehog Helpline veterinarian and can only be prescribed by a vet and no other staff members.

Appendix 4: Guide to Ageing Hoglets - by Keith Jones

From Hoglet to Hedgehog

2 Days old **Weight 16 - 30g**

Soft white spines on the back only, no fur on the legs, face or underside. Eye slits & ears barely visible, unable to curl into a ball, but if disturbed will flex their bodies in an attempt to spike the intruder. Successful rearing is very challenging at this age & hedgehog helpline would advise not to attempt unless very experienced. Milk substitute only, 2 hourly feeds & careful control of temperature.

7 - 10 Days old **Weight 50 - 80g**

Dark, hard adult spines are now seen among the baby spines giving the hoglet a grey appearance. Able to curl into a tight ball with a very positive defence reaction – able to propel themselves into the air as much as 12mm & spike an inquisitive cat or other animal on the nose. Eye & ear slits starting to develop & a small covering of dark fur is present around the muzzle. Much easier to rear from this age, milk only with feeding stretched to 3/4 hour interval, temp. still critical. Able to emit a loud piping squeak if frightened or hungry.

14/16 Days old **Weight 100g**

Eyes open & ears evident, face & legs covered in fine fur, nothing yet on belly. Still has pudgy baby face & able to curl into a very prickly ball. Much easier to feed, a small amount of liquidised kitten/puppy food can be mixed with the milk & they may attempt to lick milk off fingers. Can sometimes be persuaded to lap from this age, may not need to be toileted as frequent as younger hogs. Will be very mobile around their pen, often lining up with excited squeaks when feeding time is close.

3 Weeks old **Weight 150g**

Very spiky, still has the pudgy baby face, but with a good covering of fine fur on legs, face & underside. Upper front teeth will start to appear & eyes will be bright & wide open. Some will still be syringe fed while others will be lapping from a dish, they are all different. Still taking milk but with a much higher solid content, "SLOP". Toileting should be a thing of the past, with all of them weeing & pooing where & when they please.

4 Weeks old **Weight 200 - 400g**

Almost overnight they turn into proper little miniature hedgehogs, their pudgy puppy like face has now become pointed like an adult. The milky slop will now have much more solid cat food in it, it will be possible over the following weeks to wean them off the milk. Their diet can now include wet cat food & cat biscuit, cooked chicken & liver.

They will start to be much more nocturnal in their habits, sleeping during the day & coming out during darkness to feed & exercise. Release into the wild isn't far off.

NOTE. All weights are approximate, a lot will depend on the size of the litter, time of year & weather conditions.

Appendix 5: Microscopy Identification of Parasites - BHPS

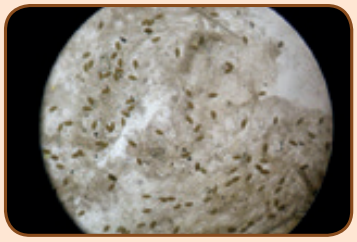
British Hedgehog Preservation Society

All photographs © Vale Wildlife Hospital - our grateful thanks for their permission to reproduce them here.

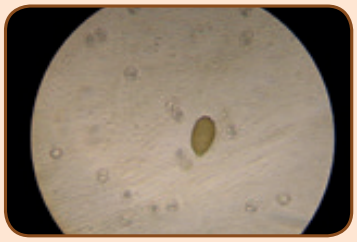
GUIDE TO WORMS

1. THORNY-HEADED WORM
(showing size -most are around one third of this size)

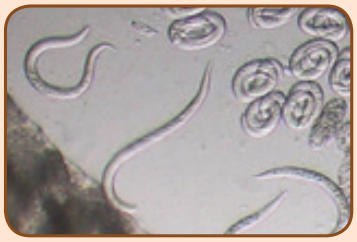
2. ADULT ROUNDWORM FULL OF EGGS (Capillaria)



3. CAPILLARIA EGGS



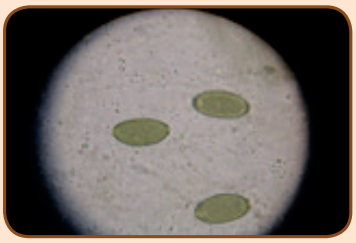
4. COCCIDIAL OOCYSTS
(showing a Capillaria egg for size demo)



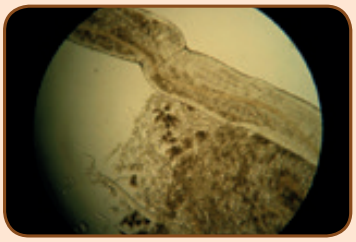
5. CRENOSOMA STRIATUM LARVAE (lungworm)

Here are some of the worms that you might find when looking at hedgehog droppings under the microscope.

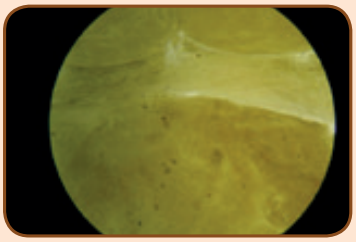
For treatment advice please see our 'Care & Treatment of Sick & Injured Hedgehogs' booklet online at www.britishhedgehogs.org.uk or available by post.



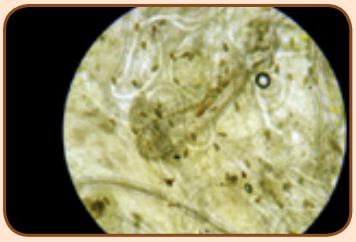
6. CAPILLARIA EGGS



7. ADULT CRENOSOMA & LARVAE

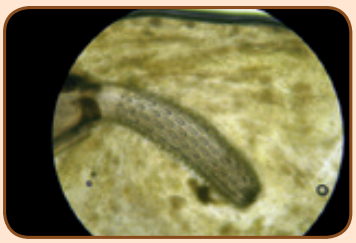


8. FLUKE EGGS



9. ADULT ROUNDWORM FULL OF EGGS

10. ADULT INTESTINAL FLUKE



11. THORNY-HEADED WORM

Hedgehog House, Dhustone, Ludlow, Shropshire, SY8 3PL
info@britishhedgehogs.org.uk www.britishhedgehogs.org.uk 01584 890801 RCN 1164542 (formerly 326885)

Appendix 6: Fluid Replacement Chart

Fluid Replacement Chart (50ml / kg)					
WEIGHT (g)	**DAILY MAINTENANCE (ml)**	**+ Add To**	**FLUID DEFICIT 5%**	**FLUID DEFICIT 10%**	**FLUID DEFICIT 15%**
50g	2.5 ml	+	2.5	5	7.5
100g	5 ml	+	5	10	15
150g	7.5 ml	+	7.5	15	22.5
200g	10 ml	+	10	20	30
250g	12.5 ml	+	12.5	25	37.5
300g	15 ml	+	15	30	45
350g	17.5 ml	+	17.5	35	52.5
400g	20 ml	+	20	40	60
450g	22.5 ml	+	22.5	45	67.5
500g	25 ml	+	25	50	75
550g	27.5 ml	+	27.5	55	82.5
600g	30 ml	+	30	60	90
650g	32.5 ml	+	32.5	65	97.5
700g	35 ml	+	35	70	105
750g	37.5 ml	+	37.5	75	112.5
800g	40 ml	+	40	80	120
850g	42.5 ml	+	42.5	85	127.5
900g	45 ml	+	45	90	135
950g	47.5 ml	+	47.5	95	142.5
1kg	50 ml	+	50	100	150

Appendix 7: Guide to Hibernation Weight

HEDGEHOG HIBERNATION WEIGHT - A COLLABORATIVE VIEW

British Hedgehog Preservation Society

www.britishhedgehogs.org.uk
tel: 01584 890 801
Charity number 1164542 (formerly 326885)

www.bwrc.org.uk
email: bwrcouncil@gmail.com
Charity number 1157841

www.rspca.org.uk
Charity number 219099

www.valewildlife.org.uk
tel: 01386 882288
Charity number 702888

There is a lot of debate surrounding survival weights for hibernating hedgehogs and it is confusing for the public and rehabilitators alike. We have also been alerted to the fact people are actively going out and looking for healthy hedgehogs to collect that are under 600g to take into care. To try to address this, The British Hedgehog Preservation Society (BHPS), British Wildlife Rehabilitation Council (BWRC), The Royal Society for the Prevention of Cruelty to Animals (RSPCA) and Vale Wildlife Hospital put their heads together to try to come up with a simple to follow guide for rehabilitators that all four bodies would be happy to put their name to. This document is a result of that collaboration.

First of all it is important to ensure that advice is based on data and sound research. Whilst experience in the field of hedgehog rehabilitation is priceless, 'hunches' cannot be properly defended against somebody else's hunch if that happens to be different. It is also important to distinguish between wild hedgehogs and captive reared (rehab) ones, particularly with respect to body weights in autumn. Sometimes acting with the best of intentions people can cause serious welfare issues for hedgehogs, so we hope this scientific advice will offer a little clarity and prevent hedgehogs from being taken from their natural habitat when not necessary.

WILD (free-living) hedgehogs

Advice to bear in mind when the public call about a hedgehog in the WILD

1. No specific weight will guarantee survival.
2. Those hibernating at less than 450g will probably not survive (although some occasionally do).
3. Greater weight may enhance survival chances, but there is no evidence of this.
4. They can, and many do, survive winter weighing less than 600g (eg 52% of juveniles)
5. They should normally be rescued at weights less than 450g in October - February (depending on weather, frequency at feeding stations, etc)
6. Rescue at 500+ g is unnecessary based on weight alone at any time of the year. (weight irrelevant if out during day unnecessarily or appears ill or injured).
7. "Rescue" at weights above 600g based on weight alone is counterproductive and strongly discouraged. Bringing a healthy hedgehog into rescue is stressful for the hedgehog, and parasite burdens are amplified causing serious problems for the animal. Also there are risks involved with being in close proximity to other hedgehogs with possible contagious conditions.
8. If a hedgehog is out during the day or appears ill or injured in any way it should be brought into care regardless of weight. *(NOTE: This advice is regarding Autumn hedgehogs - there is an exception to the 'Out During Day' rule if it is a female hedgehog nest building during breeding season or taking a break from the nest. These will be adult hedgehogs and move with purpose, out for short spells at a time).*

Once a hedgehog has been brought into care and is being over-wintered, or looked after until release, the advice is slightly different because the hedgehog will lose weight upon release. Therefore the advice below is for rehabilitators for **hedgehogs already in care**:

CAPTIVE-REARED or JUVENILES (rehab animals)

Advice for hedgehogs in care

1. Captive hedgehogs put on weight quickly compared to wild counterparts of similar age (sometimes reaching double natural weight for that age).
2. They shed this excess weight on release and thus lose weight faster than wild hedgehogs.
3. They should not be released at weights below 500g in autumn (600g in very late autumn/early winter).
4. Greater weight (eg over 600g) may enhance survival, but there is no evidence for this.
5. Excessive weight is probably not beneficial and may be harmful. Hedgehogs in care at Vale Wildlife Hospital are put on a diet if they reach as much as 1kg when being over-wintered. Optimum weights for hedgehogs vary tremendously between individuals. The optimum weight for one hedgehog could be for example 800g whereas another could be well within its normal weight range at 1100g. Vale have found that keeping hedgehogs below 1kg in weight when overwintering has limited the number developing problems due to being overweight while in captivity.
6. No specific weight will guarantee survival.

Appendix 8: Blood Parameters for Adult Hedgehogs

Blood Collection Spectrum for Hedgehogs	
PARAMETER	**RANGE**
PCV	0.30 - 0.45
Red Blood Cells (1006/mm3)	4.49 - 6.41
Haemoglobin (mg/dl)	9.9 - 16.3
MCH (pg)	16.8 - 18.2
MCV (fl)	49.1 - 53.2
MCHC (g/dl)	33.3 - 35.2
White Blood Cells (10 9/l)	5.5 - 17.1
Neutrophils (%)	1.43 - 11.7
Lymphocytes (%)	2.3 - 5.1
Eosinophils (%)	0.47 - 1.87
Monocytes (%)	0.06 - 0.58
Basophils (%)	0.07 - 0.69
Reticulocytes (10 9/l)	< 0.8
Thrombocytes (10 9/l)	230 - 430
Total Protein (g/l)	44 - 62
Albumin (g/l)	21 - 31
Globulin (g/l)	16 - 32
Glucose (mmol/l)	1.3 - 5.9
Urea (mmol/l)	2.9 - 12.7
Creatinine (umol/l)	0 - 71
Bilirubin, total (umol/l)	< 7
Cholesterol (mmol/l)	2.7 - 3.9
Calcium (mmol/l)	1.45 - 2.55
Phosphorus (mmol/l)	1.07 - 2.17
Sodium (mmol/l)	121 - 141
Potassium (mmol/l)	3.0 - 6.0
Chloride (mmol/l)	90 - 1.6
Alkaline Phosphatase (IU/l)	20 - 80
AST (IU/l)	1.0 - 79.0
ALT (IU/l)	22 - 70
Amylase (IU/l)	< 1500
CK (IU/l)	< 360
LDH (IU/l)	< 490

Hedgehog Helpline

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www.hedgehoghelpline.co.uk

Registered Charity 1046156