

VN's guide to guinea pigs: handling, nutrition, nursing

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Wendy Bament RVN, MSc, BSc(Hons) discusses general husbandry and common health problems encountered in this enigmatic pet in her concluding article

PART one of this article covered the behaviour, housing and anatomy of the guinea pig (VN Times12.9).

Handling

To minimise stress in guinea pigs, it is important to make initial distant assessments prior to contact with the animal. Factors such as the necessity of the handling, any respiratory or physiological debilitation that could be exacerbated by handling, and good preparation of equipment and planning to reduce handling time, should be considered. Carrying an animal from, for example, kennel to theatre should be avoided, and small carriers should be used for secure transportation.

Guinea pigs do not tend to bite or respond aggressively to handling, but are easily stressed and can damage themselves in an effort to avoid being picked up. Small boxes can be used to initially remove guinea pigs from larger enclosures. When placed on a table, guinea pigs should never be left alone, as they may try to jump off and thus damage their spines. Many do not like being touched or stroked over the dorsal head area, and will perform a thrusting motion to stop it.

While restraining a guinea pig for thermometer insertion or anogenital inspection, it is important to keep the back and rump supported, by holding the pectoral girdle/forelimbs in one hand and sitting the hindlimbs on the other hand. A combination of a large hindgut and long spine not being supported will result in an increased risk of injury. As with other rodents, guinea pigs will feel more

at ease being the right way up and with all feet on a horizontal surface, so placing the body lengthways along the handler's arm with the head tucked behind the elbow and the other hand holding its back is suitable restraint.

Nutrition

Guinea pigs are grazing herbivores and hindgut fermenters that rely on microflora to break down fibre for digestion. They must have ad-lib access to high-quality Timothy-rich hay and clean water. High-fibre, abrasive food sources are essential to wear down the continuously growing, open-rooted teeth and to support gut motility. Guinea pigs are more efficient at fibre digestion than rabbits, despite being slower eaters, and will eat until their digestive system is full, rather than reaching energy satiety.

Dietary crude fibre content should be 10 per cent minimum, but ideally 12 to 16 per cent (Girling, 2003; Keeble, 2009). Protein content should be 18 to 20 per cent to provide essential amino acids, mainly provided by plant sources, such as alfalfa hay. Guinea pigs require two to five per cent dietary fat, which is largely provided by a vegetable-based diet.

In addition to hay and fresh vegetables, guinea pigs may be fed limited amounts of commercial dry pelleted or extruded diets, which should contain at least 12 to 16 crude fibre. Monocomponent diets are becoming increasingly popular with veterinary practices as a "best practice" strategy when advising owners on husbandry and diet. Some owners, and individual animals, may struggle to adjust to changes from classic muesli diets to monocomponent diets. Guinea pigs are very sensitive to sudden dietary changes, so these should be avoided to prevent metabolic acidosis, ileus or refusal to eat or drink. However, despite the recommendation for monocomponent diets, it should be acknowledged that some clients may insist on feeding muesli mixes to their pets. In these cases, the highest quality products should be recommended and fed in limited amounts to encourage the animal to eat the entire ration. It is important for the veterinary advisor to assess products' nutritional profiles and correct feeding plans, before making a recommendation to ensure all elements of the mix are consumed. The development of monoforage may offer opportunities for extended chewing times and higher fibre levels.

Heavy ceramic bowls (10cm in diameter) are best to avoid tipping, as guinea pigs often like to perch their forelimbs on the edge while eating. More than one feeding station/bowl may be necessary to avoid squabbles within groups.

Types of hay

Hay types that may be encountered include the following.

- Timothy-rich hay – a type of grass cut in June/ July (the first cut) when it flowers, and the stem is at its longest and highest in fibre.

- Meadow hay – made up of mixed grasses, which tends to be of lower fibre content and softer than Timothy-rich hay. Therefore, it is best for bedding and feeding enrichment, rather than a main source of fibre.
- Alfalfa (Lucerne) hay – this is a forage legume rather than a grass. It has high protein content and may be too fattening for small herbivores as a main dietary component. However, it is a useful enrichment or supplement to Timothy-rich hay for young or underweight guinea pigs.

Guinea pigs perform coprophagy during the day, whereas rabbits largely do this during the night. Caecotrophs provide a source of B vitamins and optimise protein utilisation. Preventing this process could lead to weight loss and poor digestion (Johnson-Delaney, 2010).

Special dietary requirements

Guinea pigs, as with primates and humans, require vitamin C as they lack the enzyme L-gulonolactone oxidase that converts glucose to ascorbic acid. The recommended requirement for vitamin C is 10mg/kg bodyweight per day, although this should be increased to 30mg/kg/day during gestation or 50mg/kg/day to 100mg/kg/day when treating scurvy. Debilitated and/or patients recovering from an anaesthetic will benefit from vitamin C supplementation, as it may help optimise mineral absorption from the diet. This can be administered as soluble tablets in drinking water, or as multivitamin injections for scurvy cases. A well-balanced diet of fresh vegetables (leafy greens, kale, parsley, cabbage, broccoli and spinach) and pelleted guinea pig diets will provide adequate levels of vitamin C for healthy animals. However, storage requirements and best before dates must be adhered to. Where soluble tablets are used, daily cleaning of water containers is required.

Young and lactating animal requirements

Guinea pigs have a relatively long gestation (63 days) and carry up to four pups, which increases energy, protein (20 to 26 per cent) and calcium requirements. Failure to meet these demands can result in toxemia (increased fat mobilisation in response to insufficient calories) or ketosis, metabolic acidosis and hypoglycaemia (fat converted to ketone chemicals if glucose deficiency occurs). It is normal for pups not to eat or suckle within the first 12 to 24 hours of birth. They should not be force-fed, but it is important to offer quality high-fibre foods from the beginning as they develop their dietary preferences early in life.

Hand-rearing

Mix one part condensed milk with two parts cooled boiled water. Feed 1ml to 3ml every three to four hours. Early weaning is advised until seven to 10 days of age (Richardson, 1992; Girling, 2003).

Nursing

Nutritional therapy

Hospitalised patients often require special nutritional therapy. Specific recovery diets are available (for example, Supreme Recovery Plus). Care must be taken to gently insert the syringe into the diastema (space between incisors and first pre-molar where the canine would be), injecting 0.5ml to 1ml at a time so as not to over-fill the mouth. It is necessary to provide a combination of gut motility support, fibre volume and fluids and, where possible, reduce stress levels to achieve normal gut function. Probiotics may also be used to encourage naturally occurring digestive enzymes and suitable pH environment for gut microflora. Gut motility stimulants include oral cisapride, ranitidine, metoclopramide and domperidone.

Fluid therapy

The fluid maintenance requirement of guinea pigs is 100ml/kg/day. Compound sodium lactate/lactated Ringer's is used for maintenance fluid therapy during and following surgery, or for patients suffering gastrointestinal problems. Four per cent and five per cent glucose in 0.9 and 0.18 per cent saline fluids is useful in guinea pig patients experiencing hypoglycaemia, anorexia or urinary tract complications. Colloid fluids used to replace plasma volume are ideally given intravenously, although they may be given via the intraosseous route. In guinea pigs, fluid therapy may be administered orally (care must be taken, as fluid inhalation can occur), subcutaneously (if the fat pad over the cranial dorsum is avoided), intraperitoneally (avoid puncturing abdominal organs), intravenously (providing a vein access can be maintained) and intraosseously (if performed under local or general anaesthesia, although infection into the bone is high via this route).

Extra considerations

A quiet environment with hiding places, oxygen therapy, warmth and companionship may all help reduce stress levels.

Collapsed, recovering or anaesthetised guinea pigs should be maintained in sternal recumbency, with the chest slightly elevated above the considerable abdominal contents to optimise respiratory movements.

Common health problems

Dentistry

Dental disease is one of the most common ailments affecting guinea pigs seen in practice. As with rabbits, guinea pigs' teeth grow continuously.

The teeth will become overgrown, uneven and develop sharp spurs if fed a diet lacking in coarse fibre and vitamin C. Oral pain (demonstrated by anorexia and gut stasis), hypersalivation (“slobbers”; [Figure 4](#)) and abscesses may result. Sedation or general anaesthesia will be necessary to obtain radiographic skull views and perform burring of abnormal tooth growth. Complete trapping of the tongue by overgrowth of the mandibular teeth may also occur, making eating impossible.

Following dental and other oral procedures, it will be necessary to provide softened food – such as moistened pellets – alongside hay and shredded vegetables for a couple of days. Syringe feeding may be required.

Gastrointestinal

Salmonellosis, caused by *Salmonella enteritidis* and *S typhimurium*, can cause enteritis in guinea pigs. The clinical signs can be subtle and diarrhoea is not always seen; more generally, loss of coat and body condition is apparent (Girling, 2003). Diarrhoea may be seen in cases suffering from *Escherichia coli*, *Clostridium piliforme* (Tyzzer’s disease) and *Campylobacter* species. Stress, dietary changes and antibiotic toxicity may change the gut microflora and lead to overgrowth of gram-negative bacteria (Clostridia family), which may be fatal within three to five days. It is advisable to avoid antibiotics such as penicillins, cephalosporins and clindamycin that have this effect. *Yersinia pseudotuberculosis* produces intestinal abscesses and may be acquired via contaminated food or bedding from wild animals. Clinical signs are weight loss, diarrhoea, abortion and loss of condition – death will occur within a couple of months. Owing to the fact it is zoonotic and must be reported, euthanasia is usually advised.

Intestinal diseases caused by protozoa include *Balantidium coli*, which is zoonotic, causing large intestinal inflammation and diarrhoea if untreated. Coccidiosis is another intestinal disease caused by the parasite *Eimeria caviae*, and can result in watery diarrhoea in groups of young animals experiencing overcrowding and poor husbandry conditions.

Faecal impaction of the anogenital pouch is another GI condition. It is seen in older or obese individuals, usually males, where faeces becomes trapped in the anogenital pouch between the penis and anus. It can lead to constipation and infection, unless the pouch is regularly emptied (possibly daily) and cleaned gently. Weight reduction in obese individuals can help, but older males may have to get used to having this regular treatment performed.

Hypovitaminosis C, or scurvy, will occur with insufficient levels of vitamin C, which is essential for building and repairing collagen fibres used for bone, cartilage, muscle and blood vessel formation. This is a common occurrence in guinea pigs when an inappropriate diet is fed, due to their inability to store vitamin C. Effects of vitamin C deficiency are diverse, and include lameness, loose teeth, flaky skin on the ears, poor coat condition or alopecia, diarrhoea, anorexia, weight loss, haematuria and petechiation of mucous membranes. Diagnosis is usually made from clinical signs, history, and radiography, where enlarged joints and epiphyses of long bones are seen. This musculoskeletal

impact makes young and old animals most susceptible to hypovitaminosis C. Depending on severity, it can be treated by supplementing with vitamin C and treating other symptoms, but prevention is more effective than cure.

Skin

Skin diseases are usually caused by poor husbandry, overcrowding, dietary problems and stressful conditions. Skin tumours rarely affect guinea pigs and most can be surgically excised, such as sebaceous adenomas or the cystic tumour trichofolliculoma, often seen dorsally over the lumbosacral region.

Pododermatitis in guinea pigs is characterised by the skin on the plantar surface (usually the hock area) of their feet becoming ulcerated, infected and sore. It is predisposed by being housed on inappropriate abrasive flooring, unhygienic conditions or from reduced mobility, such as in obese or elderly individuals. Barrier creams may be used to initially aid healing, and softer, clean flooring should be applied where relevant.

Cervical lymphadenitis is an infection of the cervical lymph nodes that run ventrally along the neck, and is caused by the bacteria *Streptococcus zooepidemicus*. The bacteria are found in the oral and nasal mucosa of healthy guinea pigs, but access the lymph nodes when rough food particles abrade the oropharynx mucosa (Murphy et al, 1991). Large subcutaneous abscesses form, and, if not treated and surgically excised, septicaemia is likely to ensue.

Trixacara caviae is the sarcoptid mite and most common ectoparasitic disease in guinea pigs, causing dermatitis and intense irritation, resulting in deep sores, usually along its dorsum, and areas of alopecia. Most that are affected will become depressed or anorexic, and pregnancies may be aborted. Skin scrapings should be observed microscopically in suspected cases, although care must be taken with handling and hygiene, as this mite is zoonotic. Analgesia, ivermectin and nutritional and fluid therapy are the usual treatments employed. Other ectoparasites seen in guinea pigs are *Chirodiscoides caviae*, a fur mite, and *Gliricola porcelli* and *Gyropus ovalis*, both chewing lice (*Mallophaga*). None of these cause much distress, but can be treated in the same way as *T caviae*.

Hormonally induced skin diseases tend to affect guinea pig sows suffering from cystic ovaries where bilateral hair loss is observed. Hair loss may also occur in sows during gestation and after parturition. Hair loss may also be seen in groups of guinea pigs kept in cramped, overcrowded conditions and is due to over grooming. This can develop into “barbering”, which could be stereotypical behaviour or an attempt to add some fibre to the diet. Husbandry and feeding regimes must be reviewed and corrected if these signs are observed to prevent disease, boredom and cannibalism.

Respiratory disease

Bordetella bronchiseptica is the most common cause of respiratory disease in guinea pigs, which tends to be transmitted from asymptomatic rabbits, when housed together. This is an important reason to not house these two species together, but the infection can also be carried by cats and dogs (Johnson-Delaney, 2010). It causes severe pneumonia, as can the zoonotic bacteria *Streptococcus pneumoniae*, with signs of dyspnoea, consolidation in the lungs on radiographs and raspy respiratory sounds. Those that survive will probably continue to carry the organism and care must be taken when mixing these animals in a social groups to protect unaffected individuals. Other cross-species infections can occur with *Chlamydophila psittaci* (and *P caviae*), which is a zoonotic bacterial infection derived from birds. It causes conjunctivitis and can develop into pneumonia, anorexia and death when affecting debilitated individuals.

Urinary health

With regards to urolithiasis and cystitis, guinea pigs are often seen suffering from cystitis, and clinical signs are often overlooked by owners until the guinea pig refuses to eat; dysuria and haematuria are obvious, and behaviour changes due to abdominal pain are identified (Johnson-Delaney, 2010). Both boars and sows are affected, but it is most commonly seen in sows due to their shorter urethra, particularly older sows. The stones (uroliths) are usually composed of calcium carbonate, are radiopaque, can be of considerable size and not able to be passed without surgical intervention. Other stones, such as calcium oxalate, are not visible radiographically, and urine analysis and ultrasonography will be required for an initial diagnosis. Urethral obstruction may occur, and will require immediate assistance. Stones may be visualised in males and may simply require gentle removal, but this is not usually possible in the female owing to the shorter urinary tract (Johnson-Delaney, 2010). Bacterial infections that usually accompany uroliths are *Escherichia coli* and *Streptococcus pyogenes*.

Chronic progressive interstitial nephritis in guinea pigs may develop following diabetes mellitus and staphylococcal pododermatitis (Girling, 2003). Clinical signs are polydipsia, polyuria and weight loss, and blood tests may show elevated urea and creatinine in response to poor kidney function.

Reproductive disease

Ovarian cysts are developed at any age by sows and can become considerable in size, which subsequently puts pressure on other organs – and the abdominal distension alone can be painful. Bilateral alopecia may be seen with cystic ovaries. Ovariohysterectomy is usually the treatment of choice – although hormonal therapy may be used, such as deslorelin implants. Bilateral ovariectomy should be considered in young animals to prevent this condition.

Pregnancy toxæmia has been observed in guinea pigs late in the pregnancy and immediately post-parturition. Large litters and obesity exacerbate the condition, where the animal becomes depressed, anorexic and dehydrated. This can develop into convulsions and death if not treated (Johnson-Delaney, 2010). It occurs in response to a high stress or a residing disease, such as

Trixicara caviae, which result in anorexia. There then follows a rapid mobilisation of fats, and ketones from the liver leading to a ketoacidosis. Supportive treatment must be quick to save the sow, and glucose fluids or oral gels can be lifesaving as blood glucose is typically less than 3mmol/L (Girling, 2003).

I hope this overview of guinea pig husbandry and health for veterinary nurses has provided you with a practical tool for informed nursing and supporting guinea pig owners. This article is merely a platform for further investigation and the following reference list should be consulted for more in-depth information on guinea pigs.

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Questions

1 What suborder group of species does the guinea pig (*Cavia porcellus*) belong to?

- A) Lagomorpha
- B) Hystricomorpha
- C) Myomorpha
- D) Sciuromorpha

2 Which of the following would be the preferred daily balanced diet for a Guinea pig?

- A) Hay, fresh water with added vitamin C, fresh orange slices, complete pellets
- B) Hay, fresh water with added vitamin C, fresh veg, apple and celery as treats, complete pellets
- C) Hay, fresh water, fresh fruit and veg, a mix of 70 per cent complete pellets: 30 per cent dry mix
- D) Lots of fresh green veg, fresh water, apple and celery as treats, complete pellets

3 What is the most acceptable social housing arrangement for neutered guinea pigs?

- A) 1 male guinea pigs: 3 female guinea pigs
- B) 2 male guinea pigs: 1 female rabbit
- C) 3 male guinea pigs: 3 female guinea pigs
- D) 1 female guinea pig : 1 female rabbit

4 What is the dental formula for a guinea pig?

- A) I 1/1, C 0/0, PM 1/1, M 3/2
- B) I 1/1, C 0/0, PM 2/1, M 3/3
- C) I 1/1, C 0/0, PM 1/1, M 3/3
- D) I 1/1, C 0/0, PM 1/1, M 3/2

5 At what age should female guinea pigs NOT be bred from due to their pelvis fusing, which would result in dystocia?

A) 2 months

B) 7 months

C) 10 months

D) 14 months

ANSWERS Guinea pigs:

1B. 2B. 3A. 4C. 5B.