

## **RESPIRATORY DISEASES IN RODENTS**

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**Elisabetta Mancinelli** provides an overview of the clinical diagnosis of respiratory tract disease in pet rodents, including physical exam, signs and treatment

**RESPIRATORY tract disease is a common health problem in pet rodents. Rats, mice, degus and guinea pigs are more frequently affected. Respiratory infections are less commonly encountered in chinchillas, hamsters and gerbils.**

As rats and other small rodents are very popular in biomedical research, an extensive amount of information is available on respiratory diseases, based on laboratory animals.

However, considering the increasing popularity of these animals as pets, practitioners are now more frequently called to deal with such diseases. Therefore, clinical diagnosis, treatment and preventive measures in the pet field are an emerging, but often confusing, challenge for many veterinarians.

Various recognised microbial agents affect pet rodents' respiratory tracts, acting as primary or opportunistic pathogens. Their pathogenicity is extremely variable and subclinical infections are very common, in addition to synergistic interactions in which combined infections can have an additive effect in producing severe respiratory disease.

Inadequate housing and environmental conditions, such as overcrowding and poor ventilation, dietary deficiencies (vitamin C in guinea pigs and vitamin A and E deficiencies), animal strain and immune status can all play a role in predisposing to respiratory disease.

The intention of this article is discussion of the respiratory problems commonly seen affecting pet rodents.

A few simple rules can simplify the clinician's job when he or she is presented with a concerned and often overprotective pet rodent owner. Educating clients and receptionists can help make the trip to the vet a less stressful and more positive experience.

The rodent's sense of smell is well developed, so the waiting area should be quiet and safe.

Where possible, plan appointments for pet rodents at a separate time from cats and dogs, – the rodent's natural predators – or ask the owner to wait in his or her car with the rodent until it is his or her turn.

Rodents are more sensitive to the effect of heat, so the waiting area should be maintained cool (18°C to 26°C).

Many diseases are the result of poor husbandry and diet, so a good history can provide very useful information.

## **Physical examination**

During the physical examination, always record the patient's weight. Initial triage is necessary to assess if there are signs of dyspnoea, including open-mouth breathing, head nodding and increased respiratory effort. If any of these signs are seen, the rodent should be moved, with minimal handling, to an oxygen cage.

Observe the rodent in its cage for activity, grooming and presence of head tilt or any discharge. Appropriate handling and minimal restraint is then essential to avoid animal or handler injury. For example, evaluate the head, starting with ears, eyes and nose, looking for any discharge.

An otoscope should be used to evaluate the cheek teeth and oral mucosa of all guinea pigs, chinchillas and degus, as these animals have aradicular hypsodont teeth, which are continuously erupting and growing. This examination should not be carried out in any animal showing signs of dyspnoea. Palpate the lymph nodes (the prescapular and popliteal are normally palpable, whereas mandibular, axillary and inguinal will only be palpable if enlarged) and the abdomen, and examine the anogenital area.

Observe the condition of the fur and assess the general body condition. Respiration and heart rate can be difficult to measure in rodents because rates are very rapid, but lung fields can be auscultated with a paediatric stethoscope while keeping the animal on the client's arm to reduce stress. Always look for signs of dyspnoea.

## Clinical signs

Clinical signs of respiratory disease are often non-specific and can include weight loss, reduced appetite or anorexia, poor coat condition, red ocular or nasal staining (excessive porphyrin staining can be a general sign of stress or disease, or might be due to rhinitis causing secondary obstruction of the lacrimal ducts).

Sneezing, dyspnoea, laboured breathing or head tilt secondary to otitis (middle ear invasion via the eustachian tube) can also be present. A wheezing, clicking or rattling respiratory noise can be audible in some animals, even without auscultation.

If the animal is dyspnoeic, oxygen therapy should be started immediately and clinical examination delayed.

## Diagnosis

History and clinical signs are usually strongly suggestive of respiratory disease, but where an infectious cause is suspected, a definitive diagnosis should be based on a culture and sensitivity test. Common tests for cases of respiratory disease are shown in [Table 1](#).

## Treatment

Therapy can be unrewarding in eliminating the disease and, in many cases, only alleviates the clinical symptoms.

It is very important that clients are aware infected animals may initially respond to the treatment, but then relapse. More severe clinical signs can lead to a more guarded long-term prognosis.

Management of a respiratory disease can include a combination of the following methods.

- Humidified oxygen therapy for severe dyspnoeic animals.
- Provision of additional heat (21°C to 24°C), taking care not to overheat as rodents cannot pant or sweat effectively.
- Nebulisation therapy (antibiotics, mucolytics, bronchodilators, mucokinetics) for 30 to 45 minutes, two to three times daily with 5ml of fluid at a time.
- Fluid therapy and nutritional support are essential to correct any underlying deficit.
- Mucolytics (bromexine 0.3mg/animal on food) and bronchodilators (clenbuterol and terbutaline

empirically used at dog and cat dose) can also be given orally.

- Systemic antimicrobial therapy, based on culture and sensitivity when possible, should be started if an infectious agent is suspected, although no antibiotic is approved for use in rodents as many can cause life-threatening caecocolitis and should be avoided (a list of antibiotics that can be used is in [Table 2](#)).
- Consider NSAIDS such as meloxicam (0.3-0.6mg/kg PO, SC q24h).
- In case of severe pneumonia, and in terminal cases, corticosteroids may be used at anti-inflammatory dosage (dexamethasone 0.2-0.5mg/kg SC).
- Private eating time and soft moist food has to be considered with severe dyspnoea, and if the animal appears in discomfort.
- Euthanasia may be indicated in severe non-responsive cases on welfare grounds. Consider one day of quality rat life as worth one month of human life.

## Prophylaxis

In small rodent medicine, husbandry and correct management play an essential role in the prevention of respiratory diseases.

- Ventilation and cage cleanliness are particularly important with respect to the build-up of ammonia, which is a potent respiratory irritant. According to a study, there is a positive correlation between rising NH<sub>3</sub> levels and prevalence of *Mycoplasma pulmonis* lung lesions between 25ppm and 250ppm of ammonia level.

Therefore, animals should be housed in a large, wire enclosure (glass vivaria are not recommended), with good ventilation and absorbent, dust-free bedding (avoid cedar shavings, as anecdotal reports show evidence of respiratory and skin effects in different pet species: white, red and yellow cedar shavings may contain aromatic oils and terpenes that might be irritant to some animals, such as dwarf hamsters).

Microsomal oxidative liver enzymes can also be affected in rats and mice, but no clinical signs have been documented. The cage should be cleaned at least twice weekly to help prevent disease, but without causing stress.

- Rats are active and inquisitive animals, so nest materials, toys and other play accessories should always be provided in the cage. They are also social animals that can be kept in a single-sex group or a breeding pair. Avoid stress from overcrowding.

- Ensure the cage is out of direct sunlight, but keep the temperature within the recommended range (17°C to 24°C) with an environmental humidity of 45 to 55 per cent. Provide adequate shelters.
- Provide clean and fresh water daily, and supply balanced fresh food to prevent obesity.
- Do not house different species together to prevent interspecies transmission of diseases; isolate sick animals.

## Infectious agents

*M pulmonis* is ubiquitous in pet rodents and is deemed to be the most important infectious agent responsible for chronic respiratory disease in rats, whereas Sendai virus usually results in acute disease. *Mycoplasma* can affect the respiratory tract, nasal cavities and middle ear. Progression to bronchopulmonary disease can occur and the infection is persistent for life.

Many other pathogens may be involved, causing concurrent infections. These may include *Pasteurella pneumotropica*, *Bordetella bronchiseptica*, *Streptococcus pneumoniae*, *Corynebacterium Kutscheri*, cilia-associated respiratory bacillus (CAR) and Sendai virus, and must be considered in the differential diagnosis.

The most common bacteria and viruses responsible for respiratory disease in pet rodents are listed in [Table 3](#).

## Miscellaneous conditions

A variety of other miscellaneous lesions can occur in the respiratory tract of pet rodents.

Pulmonary and alveolar histiocytosis has been occasionally reported in mice and rats respectively, and is characterised by an accumulation of irregular eosinophilic crystal in the terminal airways.

Foreign body pneumonitis occurs as an incidental finding in rats, mice and guinea pigs following inhalation of, for example, bedding material, with subsequent granulomatous inflammation.

Primary pulmonary neoplasia is rare in pets, but common in laboratory rodents and is usually species, age and strain related. Benign papillary adenomas are reported in guinea pigs. Mammary carcinomas and hepatocellular carcinomas must be considered in the differential diagnosis, as these commonly metastasise to the lungs.

Clinical signs of respiratory distress can occur in heart failure, resulting from atrial thrombosis that can be encountered spontaneously in mice, rats and older hamsters. As with other species' diagnosis, the treatment and prevention of respiratory disease in pet rodents follow the

same principles, but application of more specific knowledge, regarding diseases occurring in each species, is also necessary.

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