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Chronic Respiratory Disease in Rats and Mice

(Chronic Infection with Mycoplasma and Other Disease Agents)

Basics

OVERVIEW

- The respiratory tract consists of the upper respiratory tract (the nose, nasal passages, throat, and windpipe [trachea]) and the lower respiratory tract (the bronchi, bronchioles, and alveoli [the terminal portion of the airways, in which oxygen and carbon dioxide are exchanged]).
- Chronic respiratory disease (CRD) is a long-term (chronic) condition defined by persistent infection despite appropriate and aggressive treatment; it is nonreversible and often slowly progressive.
- Mycoplasma are bacteria that commonly inhabit the respiratory tract of rats and occasionally mice. Disease depends on the potency of individual strains of mycoplasma, along with genetic susceptibility and immune system of the pet.
- Although mycoplasma alone can be the only bacteria causing respiratory disease in rats and mice, most CRD is caused by a combination of mycoplasma and other agents. Viruses such as Sendai virus, sialodacryoadenitis virus, rat respiratory virus, or pneumonia virus of rats act with mycoplasma to cause disease. Secondary bacterial infections are common, especially with *Streptococcus pneumoniae*, *Corynebacterium kutscheri*, or cilia-associated respiratory bacillus.
- In genetically susceptible rats, potent strains of mycoplasma can cause destruction of skin, cartilage, and bone in the nasal passages, or damage the bronchi and bronchioles in the lungs, causing chronic pneumonia.
- Chronic infection causes irreversible changes in the lungs and nasal passages. Cure of infection in these animals is unlikely, and chronic reoccurring respiratory disease is common.
- Mycoplasma and other organisms may also spread to the inner ear via the eustachian tube, causing inner or middle ear infections and balance disorders.



SIGNALMENT

- Common in rats, less so in mice; rare in other rodents
- No specific sex predilection
- More common in older animals (not seen in animals under 3 months of age)
- Stress, aging, and concurrent disease predispose to outbreaks.

SIGNS

- Upper respiratory tract disease—sneezing, nasal and eye discharge, increased respiratory sounds (wheezing, “snoring”), porphyrin discharge (red tears)
- Acute respiratory distress—increased respiratory rate, profound respiratory distress; may progress to respiratory arrest and death
- Inner or middle ear infection—head tilt, circling, wry neck
- Lower respiratory tract disease—poor hair coat, weight loss, emaciation, difficulty breathing
- Rats may otherwise appear bright and alert to severely lethargic or comatose depending on the severity of disease.

CAUSES

Long-term (chronic) airway inflammation initiated by multiple bacteria and viruses

RISK FACTORS

- Contact with other infected animals, although probability of purchasing a mycoplasma-free rat is unlikely
- Poor husbandry, especially overcrowding, poor sanitation, and poor airflow, increases risk for development of disease.
- Obesity
- Other sources of immune suppression (for example, underlying liver or kidney disease) may predispose to clinical disease.

TREATMENT

APPROPRIATE HEALTH CARE

- Usually outpatient—nebulization chambers can be set up to be given at home in some cases
- Inpatient—Patients that require oxygen therapy, injectable medication, or administration of medication in a fine spray or mist that is breathed in (known as aerosol therapy); patients that owners cannot keep calm at home during recovery

ACTIVITY

- Exercise—moderate (not forced); useful in clearing secretions from the airways; assists with weight loss
- Limit if exertion causes difficulty breathing

DIET

- Weight loss is critical in obese animals—improves oxygen levels in the blood, attitude, and exercise tolerance, and decreases cough frequency in obese patients
- Provide a balanced, nutritionally complete diet

MEDICATIONS

Medications presented in this section are intended to provide general information about possible treatment. The treatment for a particular condition may evolve as medical advances are made; therefore, the medications should not be considered all-inclusive.

Medications to Enlarge or Dilate the Bronchi (known as bronchodilators)

- Beneficial effects (depends on the particular medication)—enlargement or dilation of the bronchi (bronchodilation); improved secretion clearance mechanism of the lungs (mucociliary clearance); improvement in function of the diaphragm, the muscle between the chest and abdomen; lowered blood pressure in the pulmonary artery
- beta--agonists—terbutaline and albuterol, can be given by injection or in an inhaler
- Aminophylline or theophylline—oral administration

Antibiotics

In rats, if mycoplasma is suspected or confirmed, a combination of enrofloxacin or ciprofloxacin and doxycycline is often given for a minimum of 2 weeks. With CRD, long-term treatment or intermittent treatment may be needed lifelong. Azithromycin can be an effective alternative antibiotic treatment.

Nebulization

Various protocols for nebulization exist and can be very helpful. For long-term home use, owners may purchase nebulizers intended for human use and construct a nebulization chamber by drilling holes into large plastic food storage containers, into which the rodent can comfortably fit, or by placing plastic wrap over a small cage. Sterile water, saline or hypertonic saline solutions, antibiotics, and bronchodilators are common medications that are nebulized.

FOLLOW-UP

PATIENT MONITORING

- Pets in respiratory distress are often reluctant to eat or drink. Monitor carefully to ensure adequate food intake.
- Rats with suspected mycoplasma should be monitored for response to therapy, and for recurrence of disease, which is common.

PREVENTION/AVOIDANCE

- Keep in a well-ventilated, clean environment. Clean bedding frequently to prevent the buildup of ammonia fumes.
- Provide a high-quality diet.

POSSIBLE COMPLICATIONS

Recurring episodes of labored breathing, gradually worsening, resulting in death from respiratory distress or humane euthanasia

EXPECTED COURSE AND PROGNOSIS

- Some pet rodents live a normal life span but require intermittent treatment life long.
- Sudden (acute) worsening of signs—common with seasonal changes, air quality changes; require emergency veterinary care
- Some pet rodents will deteriorate despite intensive treatment, and have significantly shortened life expectancy.

KEY POINTS

- Chronic respiratory disease is an incurable disease, but many affected pets can live normal lives with medical treatment.
- Aggressive treatment, including weight control, avoiding risk factors, and medical treatment (medications, nebulization)—minimizes the severity of respiratory distress and slows disease progression in many pet rodents.

Notes

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