Proceeding of the NAVC
North American Veterinary Conference
Jan. 8-12, 2005, Orlando, Florida

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RESPIRATORY DISEASES OF RABBITS AND FERRETS

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INTRODUCTION

Respiratory diseases of ferrets and rabbits are not uncommon. Unfortunately, owing to the large functional reserve of the cardiorespiratory systems and the tendency for these small mammals, especially rabbits, to mask symptoms of disease, many animals are not presented early in the course of disease. Chronic pathologic processes may continue unabated and result in the presentation of a chronically ill animal. Limited space only allows for the briefest of descriptions here, but extensive reviews of rabbit and ferret respiratory medicine are available in the references.

TRAUMA

Rabbits and especially ferrets are inquisitive animals that if permitted to roam unsupervised can sustain various injuries. Bites from other pets, particularly dogs, rocker chair injuries, wounds from falling objects, and chewing through electrical cables are examples. Soft tissue and skeletal injuries to the head, neck and thorax can result in respiratory signs including dyspnea and emphysema, and most are evaluated as emergencies. Iatrogenic trauma to the glottis of rabbits is not uncommon following repeated failed attempts at tracheal intubation. Glottal swelling may result in dyspnea, increased respiratory noise, and if severe hypoxia and death.

FOREIGN BODIES

Chewing and choking on foreign bodies such as coins, pieces of rubber, grass seeds, and elastic bands can cause them to lodge in the nasal meatuses, pharynx, glottis or trachea, resulting in mild to severe respiratory signs. Aspiration pneumonia is more common in ferrets than rabbits due to the increased tone of the lapine cardiac sphincter. However, either could easily succumb to aspiration pneumonia following careless assist feeding of a liquid diet by syringe.

Figure 1. a) Large massess like this nasal abscess in a rabbit can interfere with normal respiratory function, b) Foreign body within the ventral nasal meatus of a rabbit that presented with signs of rhinitis.

IMMUNOLOGIC DISEASES

Allergic diseases such as asthma have been anecdotally reported in rabbits and ferrets but apart from experimentally induced conditions, no clinical reports could be found in the peer-reviewed literature.

CRANIOCERVICAL & THORACIC MASSES

Masses outside the respiratory system may exert extraluminal pressure and exert respiratory compromise. Abscesses, granulomas, or neoplasms affecting the head (e.g. dental abscess), neck, or thorax (e.g. lymphoma, thymoma) may compress closely associated respiratory structures. Although the respiratory signs are secondary and the primary condition needs attention, respiratory support is still warranted.

RABBIT INFECTIOUS DISEASES

VIRAL DISEASES

Reports of viral diseases affecting the respiratory system of rabbits are rare. Myxoma virus has caused ocularnasal discharge and pneumonia in protracted cases, while rabbit haemorrhagic viral disease may cause hemorrhage from the nose, mouth and within the respiratory tract. In addition, research studies have demonstrated infection with Sendai virus, herpes simplex, and infectious bovine rhinotracheitis virus, although these are unlikely to become important clinical entities in practice.

BACTERIAL DISEASES

The most notorious respiratory pathogen of rabbits is Pasteurella multocida. Pasteurella is considered a commensal organism by some, but poor husbandry and malnutrition can predispose to pasteurellosis including rhinitis, tracheitis, pneumonia, pleuritis, and septicemia. The main routes of transmission are direct contact, air-borne spread and fomites. Variability in virulence and antimicrobial efficacy necessitates cultures and sensitivity testing.

Bordetella bronchiseptica, Staphylococcus aureus, Staphylococcus epidermidis, Streptococcus faecalis, Klebsiella pneumonia, Micrococcus luteus, Escherichia coli, Streptococcus zooepidemicus, Pseudomonas aeruginosa, Bacillus sp., Moraxella catarrhalis, Enterobacter agglomerans, Proteus mirabilis, Pseudomonas putida, Pseudomonas diminuta, Alcaligenes faecalis and Escherichia coli have also been isolated from the upper respiratory tract of clinically healthy rabbits. Mycoplasma and Chlamydophila have also been demonstrated within the respiratory tract of rabbits with pneumonia. Attributing pathogenicity to any bacterial isolate can be challenging without demonstrating an immunologic or pathologic host response. Therefore, a combination of culture and biopsy histopathology are recommended to make a definitive diagnosis.
Figure 2. Lateral thoracic radiograph of a rabbit with advanced pneumonia.

MYCOTIC DISEASES
Although natural mycotic respiratory diseases have not been reported, experimental zygomycosis, aspergillosis and penicillosis have been documented, and generally require immunosuppressive therapy and heavy exposure.22-24

PARASITIC DISEASES
No reports of parasitic respiratory disease in rabbits could be found.

FERRET INFECTIOUS DISEASES

VIRAL DISEASES
Influenza type A and B can cause disease in ferrets, and are also zoonotic. Fever, lethargy, sneezing, ocular discharge, facial rubbing and anorexia are common signs, but otitis has also been reported.4, 25-29 Young, geriatric and immunosuppressed ferrets succumb to worse infections that may progress to pneumonia. Diagnosis is by virus isolation, although history and clinical signs are highly suggestive. Treatment is supportive, and although human vaccines have proven effective in the laboratory they are unlikely to become commercially available for ferrets.

Like other mustelids, ferrets are very sensitive to canine distemper virus, and the disease is typically fatal. Clinical signs include fever, anorexia, photophobia and serous nasal discharge. Vaccination using a recombinant distemper vaccine is recommended.

Experimentally, other viruses have been isolated from the respiratory tract of ferrets, including avian influenza, swine influenza, respiratory syncytial virus, infectious bovine rhinotracheitis virus, and SARS.30-35

BACTERIAL DISEASES
Bacterial pneumonia is uncommon but has been attributed to Streptococcus zooepidemicus, E. coli, Klebsiella pneumoniae, Bordetella bronchiseptica, and Pseudomonas aeruginosa.3, 4 Signs of lethargy, dyspnea, fever, nasal discharge, exercise intolerance and increased respiratory effort are not pathognomonic, and cultures plus histopathology (biopsy) or cytology (lung lavage) are required for a definitive diagnosis. Radiographs and bronchoscopy are valuable, and supportive care includes oxygen therapy, nebulization and systemic antimicrobials. Mycoplasma has been recovered from normal ferret lungs, and Chlamyphila pneumoniae has been experimentally shown to cause pneumonia. Mycobacterium in ferrets was once common in Europe, but is now rare. If mycobacteriosis suspected acid fast staining of cytology samples may provide provisional diagnosis but PCR and culture should be attempted. Due consideration must be given to the zoonotic nature of most mycobacteria.

MYCOTIC DISEASES
Rarely documented in clinical practice; however mycotic pneumonia due to Blastomyces dermatitidis, Coccidioides immitis, Cryptococcus neoformans, and Pneumocystis carinii have been reported.3, 4, 36-38 General signs of progressive lower respiratory tract disease combined with radiographic evidence of interstitial pneumonia, and poor response to antibiotics should alert the clinician to a possible fungal etiology. Samples collected by endoscopy or lung lavage should be submitted for fungal culture and cytology/histopathology.

PARASITIC DISEASES
Ferrets in enzootic areas are at risk from heartworm infection (Dirofilaria immitis). Only a few worms residing within the heart are required to cause coughing, dyspnea, lethargy, ascites, and cachexia. Lack of preventative ivermectin, radiography, echocardiography and heartworm antigen tests assist with diagnosis. Treatment using ivermectin or melarsomine have been described.

Rarely, ferrets may present with non-specific signs (anorexia, weight loss, exercise intolerance, respiratory distress) due to Toxoplasmosis. Pleural effusion may occur and aspiration for cytology may reveal the organism. Filaroides martis may cause nodular tracheobronchitis.

Figure 3. Heartworm within the right atria of a ferret that presented with dyspnea and tachypnea.

CARDIOVASCULAR DISEASES
Dilated and less commonly hypertrophic cardiomyopathy can cause signs similar to those reported in dogs and cats including dyspnea and exercise intolerance. Less commonly, valvular disease, myocarditis and cardiac neoplasia may present as respiratory complaints.
The diagnostic evaluation of a rabbit or ferret with evidence of respiratory disease should start with a thorough history and complete physical examination, including detailed palpation of the neck and neck, and auscultation of the thorax. Further diagnostic tests that may be relevant include; blood collection for hematology, biochemistry, and heartworm antigen tests; radiography (including angiography); ultrasonography especially echocardiography; endoscopic evaluation of the nasal meatuses, glottis, trachea, and bronchi; endoscopic or tracheal wash/lung lavage for for cytology/histopathology and microbiology.

Figure 5. Rabbit tracheobronchoscopy, a) normal trachea demonstrating the red smooth muscle (m) and dorsal ligament (); b) view of the normal primary bronchus (1) and first secondary bronchus (arrow); c) same view as b) but note the pronounced frothy exudate within the lumen that should be sampled for cytology and microbiology.

Therapy
Supportive care may include fluid and nutritional support, oxygen support, non-steroidal anti-inflammatory and analgesic medications. Specific therapies directed by diagnosis include nebulization and systemic antimicrobials, mucolytics, antihistamines, steroids, heart therapies (furosemide, digoxin, and ACE inhibitors), antiparasitic medications (ivermectin, fenbendazole) and rarely surgical intervention by thoracotomy or thoracoscopy.

References