RABBITS: IT’S NOT ALWAYS PASTEURELLA

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Signs of respiratory disease are probably second only to gastrointestinal signs in the frequency with which they are presented to the clinician. While the signs of increased respiratory sounds, discharge from the eyes and/or nose, sneezing, coughing, and dyspnea may suggest primary respiratory system pathology, a variety of other body systems may be intimately involved in the etiopathogenesis of the signs observed.

Historically, all respiratory system-related signs were attributed to infection by Pasteurella multocida. Such a diagnosis carried with it the implication that the disease is already chronic in nature, that a shedder/carrier state is inevitable, and that treatment is bound to fail with the “best case scenario” being temporary elimination of clinical signs. As a result, a self-fulfilling prophecy ensued, and treatment did, in fact, fail. One might argue, however, that the diagnosis was based primarily upon clinical signs, and therefore may be subject to dispute.

The goal of this article and the presentation that accompanies it is to provide an overview of the variety of etiologies, which may be manifest as respiratory disease, what is frequently referred to as “pasteurellosis.” This will not be an all-encompassing discussion; specific in-depth coverage is readily available in the resources listed at the end of this article.

CLINICAL SIGNS

The clinical signs associated with respiratory disease in the rabbit are very similar to those seen in traditional companion pets. Sneezing, with or without nasal discharge, is commonly noted. Nasal discharge, varying in appearance from serous, mucoid, or purulent, is likely the most common sign noted. An indirect sign of nasal discharge is a pasting of the fur on the medial aspect of the antebrachia, occurring as a result of self-grooming efforts by the rabbit. Ocular discharge or conjunctivitis may be noted. Audible respiratory noise, rattling sounds, stridor, or even “snoring” sounds, are common. Dyspnea may be noted and may be associated with inspiration, expiration, or both.

Upper respiratory discharge has been given the common name of “snuffles” and has typically been attributed to Pasteurella infection. The signs, however, are not pathognomonic and the diagnosis of pasteurellosis based on clinical signs alone is probably inappropriate. The following is a description of a number of other causes of respiratory disease in the rabbit.

INFECTIOUS DISEASES

Pasteurellosis

While not the only cause of respiratory disease in the rabbit, it most assuredly does account for a significant percentage of cases. Caused by Pasteurella multocida, infection is not limited to the respiratory system. There are apparently five different outcomes to infection by the organism in the rabbit: (1) resist infection, (2) spontaneous resolution of infection, (3) subclinical, inapparent carriers, (4) acute disease, and (5) chronic infection. The disease may be transmitted by either direct contact or via fomites. Infection is common in all age groups of rabbits, although chronic disease is obviously more commonly seen in adult rabbits. Clinical signs encountered are dependent upon a variety of factors, including host immune response, which may be related to underlying stressors, bacterial serotype, and virulence factors.

The diagnosis of pasteurellosis is based only upon the identification of the organism on culture. P multocida is typically more difficult than most to isolate, being rather fastidious and easily inactivated in transport media by the rigors of shipment from clinic to reference laboratory. Purulent discharge is also likely to inhibit bacterial growth. As a result, an appropriate sample, typically a deep nasal swab, is an appropriate sample. Serologic techniques are also available for diagnosis of pasteurellosis; however, their interpretation is subject to error. Clinicians are advised to contact the reference laboratory for guidance in the interpretation of Pasteurella serologic tests offered.

Bordetellosis

Bordetella bronchiseptica is considered to be a normal inhabitant in small numbers in the rabbit upper respiratory tract. Clinically significant infection seems to be most common in younger rabbits, with fewer clinical infections in older ones. Most infections result in rhinitis, although sinusitis, bronchopneumonia, or pleuritis may be encountered. The diagnosis is based upon the proper interpretation of microbiologic culture.

Staphylococcosis

Staphylococcus aureus and S. albus may be isolated from both healthy and diseased rabbits. In most cases, infection is secondary to some other condition, which has compromised the respiratory mucosa. Other infectious agents, chronic malnutrition, poor ventilation, and inadequate humidity are examples of predisposing factors. As in most infections, pathogenicity is the result of the interaction of organism virulence and host susceptibility. Staphylococcus tends to disseminate easily from the upper respiratory regions, and otitis media, bronchopneumonia, and pleuritis are not uncommonly encountered.

Other Bacteria

A variety of other organisms have been recovered from rabbits with upper respiratory disease. Moraxella bovis, Mycobacterium spp, Francisella tularensis, Escherichia coli, Pseudomonas aeruginosa, and Klebsiella spp have all been reported in association with upper respiratory disease in rabbits. As with staphylococcal infections, these infections are often secondary in nature. Anecdotally, in the author’s experience, many are often identified in rabbits that have
been subjected to long-term antibiotics. It is uncertain whether they were present at the time of initial presentation, as cultures were not performed, or if they gained a foothold as a result of the effects of the antibiotics on resident microbes.

**Mycoplasmosis / Chlamydophilosis**
A mycoplasma, *Mycoplasma pulmonis*, has been isolated from rabbits with upper respiratory tract disease. It is unclear the role that this organism played in infection, as there was limited effort made to rule out other causes of disease. Additionally, from the practitioner’s perspective, mycoplasma cultures are typically unrewarding, as the organism seems to be difficult to recover, transport, and culture in remote reference labs. Also, many rabbits are subjected to mycoplasma-cidal drugs, such as enrofloxacin, very early on in the disease process, thereby further decreasing the chances for recovery of the organism.

**Fungal Infections**
A variety of fungi, including *Aspergillus* spp, *Candida* spp, and *Mucor* spp have been recovered from the respiratory system of diseased rabbits. It is most likely that such infections are the result of either overwhelming exposure to moldy bedding and host immunosupression. These rabbits, again, have frequently been subjected to long-term systemic and topical antibiotics.

**Viral Infections**
Few viruses have been identified in association with respiratory disease in rabbits. The myxomatosis virus is a possible infection, as one of the clinical signs associated with the early aspects of the disease is conjunctivitis. It is unlikely that this disease would be mistaken for other infections, as its progress is rapid and the outcome is typically death.

**NONINFECTIOUS DISEASES**

**Allergies**
There is a great deal of anecdotal information on the role that “allergies” may play in respiratory disease in rabbits. Conjunctivitis, rhinitis, and bronchitis may be attributable to allergen exposure, particularly in seasons of high pollen exposure. Ruling out infectious and other noninfectious causes and the response to allergen elimination and antihistamines generally makes the diagnosis.

**Inhaled Irritants**
A number of airborne compounds may result in respiratory signs in the rabbit. Smoke, perfumes, aromatics associated with bedding, chronic ammonia fumes from urine, and chronic low humidity are all examples of irritants to the upper respiratory system. Again, the diagnosis is generally made by ruling out infectious and other noninfectious causes, and the rabbit’s response to elimination of the irritant.

**Foreign Bodies**
Foreign bodies, such as pieces of grass or hay, hairs, or grass awns may result in upper respiratory signs in rabbits. In most cases, there is a behavioral change such as sneezing paroxysm, pawing at the muzzle, or other signs of discomfort. Discharge may be noted, often progressing from a sero-sanguinous fluid to mucoid, and then purulent. Identifying the foreign material makes the diagnosis.

**Neoplasia**
As expected, neoplastic disease affecting the respiratory system will result in clinical signs. Upper airway tumors may cause dyspnea, discharge, or deformity of the muzzle. Space-occupying masses in the chest often result in dyspnea and may cause exophthalmus due to the congestion of the periorbital vascular plexus resulting from pressure being placed upon veins returning to the heart from the trunk. Endoscopic or radiographic identification of the mass followed by biopsy and histologic examination is diagnostic.

**Cardiovascular Disease**
As veterinary care for rabbits has improved, the life span has increased. As a result, the incidence of “geriatric diseases” such as cardiac diseases seems to be increasing. Cardiac disease, in the form of atherosclerosis, cardiomyopathy, and heart failure are all seen. When pulmonary edema is a component of the condition, respiratory signs are to be expected.

**Trauma**
Several forms of trauma may result in respiratory signs. Mucosal trauma associated with tracheal intubation may persist for several days after the removal of the tube. Chest trauma from improper handling and restraint may cause pulmonary contusion or injure ribs. One of the most commonly encountered signs of pain in the rabbit is an alteration in the respiratory pattern with either tachypnea or shallow respiration being noted.

It is easy to see that clinical signs attributable to the respiratory system may be the result of a number of infectious or noninfectious diseases. Pasteurellosis is only one of them. The differentiation between the differing conditions is based upon the typical medical paradigm: history, physical examination, and ancillary diagnostic testing. Of particular importance is the collection of appropriate and timely samples for microbiologic evaluation. If possible, submit culture samples before initiation of antibiotics. Maintain close contact with the microbiologist at your lab to determine the best mechanism for sample storage and transport to enhance your pathogen recovery. As more clinicians strive for and obtain definitive diagnosis of respiratory ailments, it is likely that we will continue to see that there is far more out there than pasteurellosis.
References