

RABBITS COMMON DISORDERS II: NON-GASTROINTESTINAL DISORDERS

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UPPER RESPIRATORY TRACT DISEASE

Upper respiratory tract disease is a significant cause of morbidity and mortality in pet rabbits. Etiologies of upper respiratory tract disease in rabbits include predominately bacterial infections, infections secondary to dental disease, as well as less likely neoplasia, foreign bodies, and trauma. Bacterial pathogens are the most common culprits of upper respiratory infections, with *Pasteurella multocida*, *Bordetella bronchiseptica*, and *Staphylococcus* spp. being the most commonly isolated bacteria associated with upper respiratory tract disease. Infections with these bacteria often occur very early in a rabbit's life. In most cases, these infections remain subclinical, and these bacteria are even considered by some to be part of the physiological flora. However, environmental factors, such as poor air quality, low humidity, or immunosuppression, can lead to clinical diseases involving these opportunistic pathogens.

Upper respiratory tract disease symptoms in rabbits include nasal discharge, sneezing, epiphora, dyspnea, and bony deformities of the skull. Bacterial infections of the nasal passages can lead to the production of a large amount of purulent material. This purulent material is often highly viscous and, therefore, often accumulates in the nasal passages and the adjacent maxillary recesses, obstructing the nasal passages, and causing mucosal erosion, atrophy of nasal turbinates, and deformation of nasal bones.

Radiographs do not provide a level of detail that enables an accurate diagnosis of the location and severity of the disease due to the overlap of numerous planes of tissue. Rhinoscopy can be performed in rabbits and larger rodents, but the small size of the patients is often the limiting factor. The preferred method of diagnosis of upper respiratory tract disease is computed tomography. This provides detailed information on the disease location, concurrent disease processes, and to what extent normal anatomic structures have been damaged. Evaluating the severity of the disease by CT will help determine whether medical or surgical therapy is more appropriate. Cases that benefit from being addressed surgically have already failed medical management, and/or destruction of the nasal bones has been identified.

Medical therapeutic options for clinical bacterial infections of the upper respiratory tract include systemic and topical antibiotics, which should be based on culture and sensitivity whenever possible. Bacterial culture results of nasal swabs should be interpreted cautiously because the isolated bacteria may not represent the infectious disease process. Topical antibiotics can be delivered by applying antibiotic eye drops (e.g., gentamicin) into the eyes, allowing drainage through the nasolacrimal duct into the nasal cavities. Antibiotic eye drops can also be administered through the nares, but delivery success varies considerably based on the patient's level of cooperation and the owners' ability and compliance. To improve clinical signs,

nebulization with physiological saline or diluted gentamicin in saline (5 mg/ml) can also be considered. However, nebulization of antibiotics will only be effective if airflow through the diseased nasal cavity is maintained and no obstruction by purulent material has occurred.

Surgical treatment aims primarily to reduce the amount of inflammatory debris and reestablish patency of the nasal cavity while salvaging as much normal nasal mucosa and turbinate tissue as possible. Historically the most reported technique for surgical debridement of the nasal cavities is through a dorsal rhinostomy approach in rabbits. Common and significant complications of this procedure include repeated occlusion of the rhinostomy site, significant postoperative bleeding, unpleasant cosmesis if the periosteum does not reform over the surgical site or if the bone flap is not viable, post-operative pain, and delayed healing. Therefore, as an alternative, a lateral rhinostomy procedure should be considered in rabbits. This technique is less traumatic than the dorsal rhinostomy technique, and post-surgical complications appear to be reduced in severity.

EAR DISORDERS

Disorders of the external ear canals and middle ears are common in pet rabbits. Infections of the ear canal will often lead to ear discharge, scratching at the ear, head shaking, and discomfort. Infection of the middle ear can lead to deafness, facial nerve paralysis, and changes in behavior and appetite. If the infection spreads to the inner ear, it can cause neurological signs, such as head tilt and imbalance.

Bacterial and fungal ear canal infections usually happen due to other pre-existing problems such as abnormal anatomy, foreign bodies, or neoplasia. These infections can spread to the middle ear if the tympanic membrane is no longer intact. However, bacteria can also enter the middle ear through the Eustachian tube. Neoplasia of the ear canal is rare in rabbits but should be considered, particularly in older rabbits.

Lop-eared rabbits are particularly prone to ear diseases due to their ear anatomy. In lop-eared rabbits, the outer ear canal is effectively closed over by the pinna, which makes it hard for normal cerumen to leave the ear canal. Therefore, in lop-eared rabbits, the cerumen build-up predisposes them to secondary bacterial or fungal infections, which can progress into the middle ear. Frequently in lop-eared rabbits, swellings at the ear bases can be palpated. These so-called "ear base abscesses" are connected to the ear canal and occur due to an accumulation of cerumen or pus in the ear canal, which ultimately spreads through a gap between the cartilages that form the ear canal. The outer ear canal can be examined using an otoscope; however, if a lot of inflammation or discharge is present, the tympanic membrane can often not be visualized. Frequently animals do not tolerate a thorough examination of the ear canal due to discomfort from the inflammation in the ear canal. In these cases, sedation or general anesthesia is required to thoroughly examine the ear canal and eardrum. Video otoscopy and specialized equipment are available and allow for a thorough examination of the ear canal and removal of discharge and debris using small instruments as well as irrigation and suction. Also, samples for bacterial cultures can be collected, and images taken to document findings. Video otoscopy is also very helpful to visualize and incise the eardrum (myringotomy), collect fluid from the middle ear, and submit it for bacterial culture in cases of middle ear infections. However, the middle ear cannot be completely examined by otoscopy alone, and radiographs or, ideally, a CT scan are

necessary for a complete evaluation of the middle ear. Furthermore, the middle ear effusion in most cases of chronic otitis media in rabbits is highly viscous and purulent and, therefore, will not passively drain.

Medical treatment of bacterial infections of the ear canal may include repeated flushing of the ear canal and/or oral or injectable antibiotics. In rabbits with upright ears, this approach can often eliminate the infection. In lop-eared rabbits, because of the particular anatomy of their ear canal, medical treatment will usually only, at best, improve the infection for a certain period before reoccurrence is noted. Ear infections in lop-eared rabbits can be frustrating to manage for both veterinarians and rabbit owners.

Chronic or recurrent infections of the ear canal, as well as chronic middle ear infections, will usually not resolve with medical therapy alone, and surgery remains the only option for cure. Rabbits tolerate ear surgery very well, recover quickly, and have a much-improved quality of life following ear surgery. Different ear surgeries can be performed in rabbits. For treatment of diseases of the ear canal, usually a total or partial ear canal ablation (TECA or PECA) with lateral bulla osteotomy (LBO) is performed. The TECA involves the removal of the entire ear canal.

In some cases, part of the outer ear canal can be preserved if the infection is located only in the deeper parts of the ear canal. In such cases, a partial ear canal ablation (PECA) can be performed instead of a TECA, which will reduce anesthesia time and the risk for complications such as wound dehiscence and vascular compromise of the pinna after surgery. During TECA-LBO or PECA-LBO procedures, collecting samples for bacterial cultures is critical to guide post-surgical antibiotic therapy better. In some cases, placing antibiotic-containing beads in the middle ear might be beneficial, as it releases antibiotics slowly over a longer time. In rabbits, the surgical site should be closed completely after surgery. The surgical site heals within 7-10 days, and the sutures can be removed. Most rabbits do very well after surgery and often start eating on their own on the day of surgery. Pain medications and supportive care are provided, and most rabbits can be discharged from the hospital within 1-2 days after the ear surgery. Post-surgical complications can include iatrogenic facial paralysis and, less commonly, vestibular signs, which usually resolve over time.

THYMOMAS

Thymomas are the most common neoplasm of the thoracic cavity in rabbits and are increasingly diagnosed in older rabbits. Rabbits usually present with a history of reduced activity, and/or increased respiratory rate or effort. Less commonly problems swallowing or choking may be reported. However, in many cases, thymomas are incidental findings during thoracic imaging. The physical examination can be unremarkable or may reveal bilateral exophthalmos, a heart murmur, or a shift in audible heartbeats either to the left or right thorax, tachypnea, or dyspnea. Thoracic radiographs will reveal an intrathoracic soft tissue mass, dorsal deviation of the trachea, and/or displacement of the heart. However, it may be difficult to distinguish a thymoma from cardiomegaly in some cases. Therefore, thoracic ultrasound or computed tomography is required to confirm the diagnosis of an intrathoracic mass. The diagnosis of thymomas is made by cytological evaluation of a fine needle aspirate (FNA) of the mass. Differentials for intrathoracic masses in rabbits include thymic lymphoma, thymic carcinoma, thymic hyperplasia, or mediastinal abscess. If FNA is not diagnostic an ultrasound-guided core biopsy may be

necessary. Treatment options for thymomas in rabbits include surgical removal, radiation therapy, and palliative medical therapy using prednisolone.

Surgical therapy is not recommended by the author, due to the high risk of intra-operative and post-anesthetic complications. Instead, radiation therapy is well tolerated by rabbits and has been reported to successfully resolve clinical signs and result in a median survival of 2 years (range) 1-3 years). However, medical treatment with prednisolone has recently been reported to cause a similar survival rate and improvement of clinical signs, as radiation therapy, without the associated anesthetic risks and costs. Prednisolone (0.5-1 mg/kg PO q24h) is well-tolerated in rabbits for long-term use.

CERVICOFACIAL CELLULITIS

In large breed rabbits presenting with pyrexia (> 104.4 F (40.2C) a bacterial infection of the soft tissues of the head and neck should be a top differential. Physical exam may reveal diffuse or focal soft tissue swelling or thickening. Leukopenia with marked toxic left shifts were reported in most cases. Bacteria isolated were predominately gram-negative pathogens, including E. coli and Pasteurella, but also anaerobic bacteria. The prognosis for this condition is currently considered poor, despite aggressive medical therapy including intravenous antibiotics. If cases survive long enough abscesses may form which can be surgically removed.