

Respiratory disease of small ruminants

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Abstract

Although respiratory disease of small ruminants manifests and responds similarly to respiratory disease of cattle, there is much less research and resources aimed at diagnosis and treatment. Limited vaccinations, diagnostic tests and approved pharmaceuticals make it a more challenging landscape to navigate for the practitioner. Despite this, similar approaches in case workup, treatment selection and monitoring can be utilized as with other species. A few diseases unique to small ruminants should be kept in mind, and proper drug usage should be in the forefront of practitioners' minds when managing these cases.

Key words: goat, sheep, pneumonia, respiratory disease

History and physical examination

A standard history and physical examination are sufficient for working up a case of respiratory disease in either an individual or a herd. In the history, special attention to acquisition of new animals, travel, co-mingling and environment are important to note. Poor ventilation and dusty environments can predispose to respiratory disease. While a full physical examination should be performed, it is the author's opinion that effort should be made to differentiate lower vs upper respiratory disease, and gain clues about chronicity and severity. Localizing the pathology helps guide diagnostic treatment.

Differentials and diagnostics

Upper respiratory disease

Upper respiratory disease is common in small ruminants and has a few unique etiologies. Sinusitis may follow cosmetic de-horning or trauma to horns and can be treated similarly to cattle. It is typically characterized by unilateral nasal discharge. Nasal tumors may also cause unilateral nasal discharge, and enzootic nasal tumors should be considered if multiple animals in a herd are affected. Nasal bots can cause similar clinical signs as well as sneezing and irritation of the head. *Corynebacterium pseudotuberculosis* may cause abscessation of retropharyngeal lymph nodes and signs of upper airway obstruction. Necrotic laryngitis can occur in small ruminants and seems to more frequently affect breeding males. Temporary tracheostomy, antimicrobials and supportive care may be curative for some mild to moderate cases. Permanent tracheostomy and removal of deformed or abscessed cartilage has been inconsistently successful in the author's experience. Endoscopy and radiography are likely to be the most rewarding diagnostics, though ultrasound of laryngeal cartilages is described and may help guide diagnosis.

Lower respiratory disease

Pneumonia or lower airway disease is caused by many of the same pathogens in small ruminants as large animals. They likely have their own respiratory viruses which play a role in secondary bacterial colonization with *Mannheimia haemolytica*, *Pasteurella multocida* and others. The same risk factors such

as stress, transport, co-mingling and weather changes play a role in development of disease. Some unique considerations for sheep and goats include ovine progressive pneumonia (and less commonly caprine encephalitis-arthritis virus) and pulmonary adenocarcinoma when evaluating animals with respiratory signs. Otherwise, diagnosis and workup can be performed similarly to other species.

While ultrasound and radiography may not be practical for evaluation of herd-level outbreaks, they are extremely useful for individual animals, especially those with chronic signs. The author especially recommends them for the valuable show or breeding animals that are often victim of wild and inconsistent antimicrobial usage before presentation to a veterinarian. Ultrasound is fast, easy and provides information about presence of pleural effusion and surface lung lesions. Radiographs provide the advantage of showing the distribution of pathology and a pattern of lesions. Additionally, abscesses may be more visible on radiographs, and the author finds radiographs the most useful and accessible for conveying severity of disease to owners.

Obtaining a sample for culture helps guide treatment. The author does not recommend using nasal swabs, except in cases of suspected *Mycoplasma*, as the presence of pathogens in that scenario does not provide concrete evidence for them as the causative agent of disease. Ideally, transtracheal lavage fluid, bronchoalveolar lavage fluid, or lung tissue is used for culture. Transtracheal wash is described in other species, and can be performed in small ruminants using the kits designed for foals produced by MILA. Cytology on said fluid can also help discern if an allergic, parasitic or inflammatory component may be present in active respiratory disease.

If evaluating a herd outbreak and imaging or fluid collection are not acceptable diagnostics to the client, a dead or euthanized animal can provide excellent diagnostic utility. A gross necropsy will confirm presence of severe respiratory disease, and lung tissue is an excellent sample for culture or PCR. The author always recommends a susceptibility with any culture, as susceptibility patterns can vary dramatically among isolates.

Treatment

Antimicrobial selection can be frustrating due to the lack of labeled products for small ruminants. The only labeled product for goats is ceftiofur (Naxcel®, Ceftiflex®) and for sheep tilmicosin (Micotil®), penicillin and ceftiofur are available. All other drugs are considered extra-label use, which is allowable under AMDUCA if requirements are met. Beta-lactams are ineffective against *Mycoplasma* species, so the author typically reaches for tulathromycin or florfenicol in cases with confirmed or likely *Mycoplasma* involvement. These drugs have established withdrawal times which are available without a request from the FARAD website. Although a popular choice among laypeople, extra-label use of fluoroquinolones is prohibited, and enrofloxacin is not a legal treatment for sheep and goats.

In herd outbreak situations, the author prefers to examine all or most of the animals, with a focus on animals with clinical signs. Rectal temperatures can help make treatment decisions

for mildly affected animals. There are situations where metaphylaxis may be indicated, though it is not the author's first choice of antimicrobial stewardship strategies. The author typically uses an initial first line antibiotic for all treated animals, and does not switch unless there is reasonable evidence of treatment failure in the herd or individual animals require additional evaluation and treatment. This information should be recorded and used for reference if repeat treatment is required. Animals requiring repeated treatment while other animals are included are usually those that have developed chronic complications, as discussed below.

In valuable individual animals, supplemental oxygen through a nasal cannula can be vital in an acute crisis. Temperature control is also vitally important, as heat stress can exacerbate respiratory disease. Intravenous antibiotics may be beneficial in severe cases and help hasten recovery. If pleuropneumonia is

present, drainage and lavage of the thoracic cavity is indicated, which can be done with intravenous catheters. Nebulization with antibiotics or bronchodilators can be performed if the clinician has access to the device. Intravenous fluids, transformation, nutritional support, and pain relief can all assist in a more comfortable patient. Although the author preached the advantages of imaging above, she typically uses clinical response to guide cessation of therapy in severe cases, as radiographic changes often lag significantly behind clinical improvement, and can be discouraging to clinician and owner.

Ultimately, management of respiratory diseases in sheep and goats does not differ dramatically from other species and clinicians should use their best judgement and diagnostic tools available to manage these cases.

