

Pasteurellosis of Sheep and Goats

Pasteurella and Mannheimia organisms are beta-hemolytic, gram-negative, aerobic, nonmotile, nonsporeforming coccobacilli in the family Pasteurellaceae.

-This family tends to inhabit the mucosal surfaces of the alimentary, respiratory, and genital tract of mammals.

- Many are known as opportunistic secondary invaders.

- Pasteurella haemolytica biotypes A and T were reclassified as Mannheimia haemolytica (biotype A) and Pasteurella trehalosi (biotype T).

- M haemolytica A2 is the most common strain isolated from sheep and goat respiratory pasteurellosis,

-M haemolytica A2 is routinely reported from cases of mastitis in sheep.

-Pasteurella multocida has also been reported as a cause of pneumonic pasteurellosis in sheep and goats.

Etiology

1-M haemolytica and P trehalosi are distributed worldwide,

2- and diseases caused by them are common in sheep and goats of all ages,

3-M haemolytica, P trehalosi, and P multocida are common commensal organisms of the tonsils and nasopharynx of healthy sheep and goats.

4-In order for these organisms to cause infection, a combination of **stressors including heat, overcrowding, exposure to inclement weather, poor ventilation, handling, and transportation leaves sheep and goats susceptible to respiratory viral infections.**

5-Parainfluenza 3, adenovirus type 6, respiratory syncytial virus, possibly bovine adenovirus type 2, ovine adenovirus types 1 and 5, and reovirus type 1 cause primary respiratory infections that are rarely life threatening but predispose to secondary M haemolytica infections.

6- Respiratory infections with Mycoplasma ovipneumoniae and Bordetella parapertussis have also been reported to be associated with secondary M haemolytica infections.

Pathogenesis

The combination of stressors and primary infections are thought to break down the mucosal barrier integrity of the lower respiratory tract allowing M haemolytica to colonize, proliferate and induce significant tissue damage.

The virulence of *M haemolytica* and *P trehalosi* is mediated by the action of several factors, including .

-**endotoxin, leukotoxin, and capsular polysaccharide**, that afford the bacteria advantages over host immunity.

1- The leukotoxin is particularly important in the pathogenesis because it is specifically toxic to ruminant leukocytes resulting in fibrin deposition in lungs and on pleural surfaces.

2-The lipopolysaccharide endotoxin contributes to adverse reactions in the lungs and also leads to systemic circulatory failure and shock.

3-The capsular polysaccharide prevents the phagocytosis of the bacteria and assists in attachment to the alveolar epithelial surface.

Survival of the acute phase of pneumonic pasteurellosis is dependent on the extent of lung involvement and damage in the lower respiratory tract.

Sheep and goats that recover may have chronic respiratory problems, including reduced lung capacity and weight gain efficiency if over 20% of the lung was damaged.

Clinical Findings

disease caused by *M haemolytica* is uncommon in adult sheep, unless there is a predisposing problem such as ovine pulmonary adenocarcinoma or other viral infection.

1- *P trehalosi* mainly causes septicemia and systemic pasteurellosis in young sheep.

2- The systemic form of pasteurellosis caused by *P trehalosi* is characterized by fever, listlessness, poor appetite, and sudden death in young sheep.

3- Affected sheep are typically separated from the remainder of the flock and are easily caught. fever ($>40.5^{\circ}\text{C}$).

4- The mucous membranes are congested, and there may be evidence of dehydration with sunken eyes and extended skin tent duration.

5- Auscultation often does not reveal significant changes other than an increased respiratory rate.

6- Ruminal contractions are reduced or absent.

7- There may be evidence of diarrhea.

8- Frothy fluid may be noted around the mouth during the terminal stages.

9-The organism is thought to move from the tonsils to the lungs and pass into the blood.

This results in septicemia and localization of the infection in one or more tissues such as the joints, udder, meninges, or lungs.

Diagnosis

The differentiation of pasteurellosis from other causes of respiratory disease is based on the high mortality and rapid progression to death.

Diagnosis of pneumonic and septicemic forms of pasteurellosis is based on necropsy examination, gross and histopathologic findings, and isolation of organisms from a range of tissues.

Lesions include:

1- subcutaneous hemorrhage; epithelial necrosis of the tongue, pharynx, esophagus, or occasionally the abomasum and intestine

2- and the airways contain blood-stained froth.

3-Cases of longer duration show anteroventral consolidation and fibrinous pleurisy.

4- enlargement of tonsils and retropharyngeal lymph nodes;

and peracute, multifocal, embolic, necrotizing lesions in the lung and liver.

Differential diagnosis

Viral interstitial pneumonia .

- ◆ **Enzootic pneumonia of calves .**
- ◆ **Bovine respiratory syncytial virus .**
- ◆ ***Haemophilus somnus* infection .**
- ◆ **IBR .**
- ◆ **Verminous pneumonia .**
- ◆ **Allergic rhinitis .**
- ◆ **Pulmonary abscesses .**
- ◆ **Calf diphtheria .**
- ◆ **Aspiration pneumonia .**
- ◆ **Enzootic nasal granuloma.**
- ◆ **CBPP .**

Treatment

Whenever possible, treatment should be based on bacterial culture and sensitivity, especially in herd or flock outbreaks, when valuable animals are involved, or in acute or chronic cases when initial therapeutic attempts have failed. Commonly recommended antibiotics include

RX

1 -oxytetracycline (10 mg/kg/day of non-long-acting product, or 20 mg/kg once of the long-acting product),

2- tylosin (10–20 mg/kg, once to twice daily). Therapy should continue for at least 24–48 hr after body temperature has returned to normal.

Duration of treatment usually is 4–5 days.

-Acute cases may also benefit from the use of NSAIDs (eg, flunixin meglumine or ketoprofen) in conjunction with antibiotic therapy for control of endotoxemia and inflammation.

5% of isolates may show resistance to tetracycline.

-Ciprofloxacin appears to be very efficacious,

- Parenteral fluids

Prevention

-Pasteurellosis prevention would be desirable given the economic costs of treatment, losses, and reduction of weight gains in survivors.

-Commercial vaccines are available for cattle but unfortunately are specific for *M haemolytica* A1, and there is little or no cross protection against *M haemolytica* A2 experimentally.

- Commercial vaccines for *M haemolytica* A2 are available

Because there are no commercial vaccines, producers are able to get autogenous bacterins for their flocks.

- Prevention of respiratory viruses by utilizing a vaccination program would be expected to decrease respiratory pasteurellosis,

-but there are no commercial vaccines available for use in sheep and goats.

-Inclusion of prophylactic antibiotics, mainly tetracycline, in the feed during the months of the year with the highest incidence is a common management practice.

- Avoidance or reduction of known stressors such as heat, overcrowding, exposure to inclement weather, poor ventilation, handling, and transportation should also be considered.

