Bluetongue in small ruminants

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Abstract

Case descriptions and photographs depicting characteristic symptoms of bluetongue in small ruminants will be presented as well as recommendations for diagnosis, treatment, and prevention of further cases for this insect-transmitted viral disease.

Key words: small ruminants, bluetongue, BTV

Résumé

Une description de cas et des photographies montrant les symptômes caractéristiques de la fièvre catarrhale chez les petits ruminants seront présentées de même que des recommandations pour le diagnostic, le traitement et la prévention de nouveaux cas de cette maladie virale transmise par des insectes.

Introduction

Bluetongue virus (BTV) is an arthropod-borne Orbivirus from the family Reoviridae that includes both bluetongue virus and epizootic hemorrhagic disease virus. There are currently 26 serotypes of BTV worldwide, and this virus is capable of re-assorting to form new variants. Not all serotypes cause clinical disease, and the virus is transmitted from animal to animal by biting midges of the genus Culicoides. BTV can persist long term if the climate and vectors are suitable, and the virus can replicate in a variety of both domestic and wild ruminants without causing clinical disease. Bluetongue is not a zoonotic disease, and based on antibody testing, the virus may infect dogs and a variety of domestic and wild cats.

Transmission

Incidence of bluetongue correlates with the late summer to early fall vector season. In the southern and western United States, BTV replicates in the red blood cells of infected cattle and sheep, while Culicoides sonorensis moves the virus from one infected host to another. BTV may persist in cattle for up to 11 weeks post-infection and may survive over winter in the vector. Virus concentrations are minimal in body fluids, so transmission through aerosol, direct or indirect contact is unlikely. Semen may transmit BTV if the bull is viremic at breeding or collection, while embryo transfer does not transmit disease if the donor is not viremic and the embryos are adequately washed prior to transfer.

Clinical Signs

Clinical disease is most severe in sheep, while subclinical infection is more typical in cattle, goats, and cameldids. The virus has tropism for macrophages and endothelial cells. Infected sheep develop high fever of 105 to 107°F (40.5 to 41.6°C) followed by salivation, hyperemia of the oral mucosa, oral ulcers, and frothing at the mouth. The early serous nasal discharge turns mucopurulent, and the muzzle, ears, head, and neck become edematous. Inflammation of the coronary band may lead to lameness with recumbency due to pain. The Culicoides spp vector season coincides with testicular growth and engorgement prior to the sheep breeding season, so males may exhibit pain and lameness due to testicular swelling. Bluetongue in sheep is characterized by high morbidity and lower mortality.

The reproductive effects of bluetongue depend on the stage of pregnancy at the time of infection. Early embryonic death may occur with return to estrus, and later fetal infection may lead to congenital defects in the developing brain, mumification, arthrogryposis, and occasionally abortion. Due to fever and engorgement of the testicles, most males experience transient infertility, while others suffer permanent sterility.

Clinical signs in cattle are rare but may include fever, hyperemia of the muzzle, salivation, oral vesicles and ulcers, lameness, and abortion or delivery of abnormal calves. Blueto- tongue in whitetail deer is characterized by fever, depression, anorexia, pulmonary edema and hemorrhage throughout the body. Pronghorn antelope may die suddenly following decrease in appetite and activity and recumbency, yet neither elk nor mule deer develop symptoms when purposefully infected. The few reported clinical cases in cameldids exhibited hiccup-like breathing, anorexia, frothing at the mouth due to pulmonary edema, weakness, recumbency, and death in 24 hours. Pregnant dogs may abort or deliver stillborn pups and then die within 3 to 7 days.

Postmortem Lesions

Animals dying from bluetongue exhibit hyperemia, hemorrhage, erosions throughout the gastrointestinal tract, heart petechiae, focal necrosis of the cardiac papillary muscle, pulmonary edema, pleural and pericardial effusion, and edema in the muscles and fascia. The cause of death is respiratory failure due to pulmonary edema. Aborted fetuses and newborns may exhibit cavitating lesions in the brain, hydrencephaly, porencephaly, retinal dysplasia, and skeletal abnormalities.
Differences between goat kids and calves in relation to disbudding practices

Disbudding practices for dairy goat kids and calves appear to be similar; however, when considering goat welfare, it is important to recognize that goat kids are not small calves. Establishing best-practice guidelines for disbudding goat kids requires managers to recognize that they are not small calves.

In many parts of the world, disbudding using a hot cautery iron is the most commonly used method to disbudd goat kids and calves. Calves and goat kids are generally disbudded at an age where the horn buds have not yet fused with the frontal bone of goat kids. Calves and goat kids are generally disbudded at an age where the horn buds have not yet fused with the frontal bone and a keratinized horn is clearly visible, disbudding is ineffective, and horns must be removed by amputation. In some cases, additional methods including use of saws or obstetrical wire are required for complete disbud removal.

The frontal bone of goat kids is thin and the frontal sinuses can be large and may contribute to a significant source of pain, therefore more rapid or efficient methods can be considered.

Goat kids have a limited capacity to process iron compared to cattle and therefore higher iron concentrations are often required for effective disbud healing and reduction in meat quality compared to that of hornless cattle.

Establishing best-practice guidelines for disbudding goat kids requires managers to recognize that they are not small calves. Experimental studies evaluating pain in goat kids are limited, with most studies focusing on horns compared to dehorning. Cautery disbud iron is the most commonly used method to disbud goat kids and calves. Cautery iron is the most commonly used method to disbud goat kids and calves. Calves and goat kids are generally disbudded at an age where the horn buds have not yet fused with the frontal bone and a keratinized horn is clearly visible, disbudding is ineffective, and horns must be removed by amputation.

Introduction

Disbudding causes pain, impacting on the welfare of both species. The objectives of this review are to evaluate scientific literature concerning the pain mitigation and welfare of dairy goat kids and calves. The review aims to provide insights into the current pain mitigation strategies across the species.

Methods

A literature search was conducted in PubMed, Google Scholar, and Google. Search terms included disbudding, horn bud, goat kid, calf, and pain mitigation. Articles published from 2009 to 2018 were included.

Abstract

Limited scientific literature is available for developing best-practice guidelines for the disbudding of goat kids. There is significant variation in methodologies including age, iron power source, temperature and iron application timing, and higher risks of brain injury in kids compared with calves. In addition, goat kids and calves include reducing the risk of injuries to other animals or stock people, increased amount of space required at feed racks, and can have an impact on the welfare of these two species. There are significant differences in methodologies including age, iron power source, temperature and iron application timing, and higher risks of brain injury in kids compared with calves.

Diagnostic

BTV can be isolated from blood, spleen, lymph nodes, and bone marrow. Detectable bluetongue antibodies develop within 7 to 14 days post-infection and can be identified by PCR, ELISA, or AGID tests. PCR and ELISA can be used to determine serotype and to differentiate bluetongue from epizootic hemorrhagic disease of deer, and an indirect ELISA test can be used on milk samples.

Treatment

Supportive therapy forms the basis of treatment for bluetongue. Affected animals should receive soft food and warm water while being housed in deeply bedded appropriate shelter out of the wind and wet. Systemic flunixin meglumine administered once daily reduces fever and provides pain relief. Daily injections of bactericidal antibiotics such as procaine penicillin G or ceftiofur prevent secondary bacterial infections. Supplemental thiamine and niacin may stimulate appetite and support glucose production. Males who survive bluetongue should be semen tested prior to using them in a breeding program.

Prevention and Control

Prevention of bluetongue is dependent on controlling the vector. Culicoides spp are found near water sources so eliminate standing water, prevent seepage around water devices, and remove dirty bedding as a breeding habitat. Housing sheep inside an enclosed barn with suitable insect control from dusk to dawn may decrease clinical cases during an outbreak.

Two modified live virus vaccines are currently marketed in the United States. Colorado Serum Company produces a bluetongue serotype 10 vaccine that is distributed nationwide, while the California Wool Growers Association created a serotype 10, 11, and 17 vaccine that is limited to use only in California. Both vaccines are serotype-specific, and there is no cross protection provided against other serotypes.