

Vet Call

by Bob Larson, DVM, University of Missouri-Columbia



Abortions due to leptospirosis and neospora

As we discussed last month, diagnosing cases of abortion is difficult and often frustrating. Good records for review and diligent necropsy of aborted calves usually are required to find the cause of an outbreak of abortions.

Last month, I wrote about two viral causes of abortion — infectious bovine rhinotracheitis (IBR) and bovine viral diarrhea (BVD). This month I am writing about two other common causes of abortion — leptospirosis (lepto) and neospora.

Bacteria cause leptospirosis in many species of animals and can be passed between species (including cattle to humans). Although abortions can occur as early as Day 90, abortion in the third trimester, stillbirths or weak calves are more common.

Lepto organisms cause long-term infections in the kidneys and are excreted in urine for a variable time depending on the bacterial strain and the age of the infected animal. Lepto organisms survive in wet environments for up to 30 days. Infection of susceptible cattle occurs through mucous membranes, abraded or water-softened skin, or sexual contact.

There are many types of lepto organisms (more than 180 serovars grouped into 19 serogroups), and each serovar is adapted to a particular host, although they can cause disease in any mammalian species. In the United States, serovar *hardjo* type *hardjo-bovis* has a “maintenance-host” relationship with cattle.

A maintenance-host relationship is characterized by high susceptibility to infection, widespread transmission within the host species, relatively low seriousness of the disease for its host, a tendency to cause chronic rather than acute disease and poor effectiveness of vaccination.

Infertility may follow localization of leptospire in the uterus and oviduct of maintenance-host *hardjo* carriers. Vaccination against *hardjo* infection in cattle did not appear to prevent kidney establishment, urinary shedding or fetal infection in an experiment that infected cattle with type *hardjo-bovis*.

By contrast, an “incidental-host” relationship is characterized by relatively low susceptibility to infection. But if infection occurs, the disease is serious, with a tendency to cause acute, severe disease. An incidental-host infection can be passed between cattle, but it often is acquired from another species.

Vaccination is fairly effective in preventing infection with incidental-host species of lepto.

Serovar *pomona* (kennewicki) is a common incidental pathogen of cattle, and the maintenance host is swine. *Leptospira* strains maintained by nondomestic animals, such as skunks, raccoons, opossums, foxes, beavers, mice and deer, can infect cattle herds that are exposed to environmental contamination, such as urine-contaminated water holes.

If risk of exposure to leptospirosis warrants an attempt to establish immunity against the organism, primary immunization of heifers should consist of two or three vaccinations given at one-month intervals prebreeding and another booster in mid-gestation of the first pregnancy. Bacterins produce immunity of fairly short duration (at most, a few months) for controlling clinical disease. The length of protection in the reproductive tract against abortion may be even shorter than for clinical disease.

Because of these limitations, annual (preferably in mid-gestation) or twice-annual boosters should be given. Methods other than vaccinations for reducing risk of exposure to leptospirosis also should be implemented. These would include having a closed herd and fencing cattle from water sources that can be contaminated by other herds, swine or nondomestic animals.

Neosporosis is caused by an organism in the *protozoa* class. It can cause abortion, stillbirths, or weak or paralyzed calves, but the dams appear healthy. It also can cause a syndrome in which the calves become paralyzed within four weeks of birth.

Diagnostic testing of blood or fetal fluids collected before the calf is able to suckle any colostrum can help indicate whether or not a calf is infected with the organism, but a negative antibody test is not an indication

that the calf does not have an infection. Microscopic examination of tissue samples will find lesions in the brain, spinal cord, heart and sometimes in other organs in calves that died or were aborted due to neosporosis.

Abortion caused by neospora has been reported in several regions, including Australia, Great Britain and North America. In certain areas, such as California, it has been shown to be a major cause of abortion.

Little is known about this disease, and current research is trying to determine how the organism is passed between animals and how it causes disease. To date, infection of a fetus from its dam through the placenta is the only known route of infection, but evidence indicates that infection after birth probably occurs.

Because the organism is related to other protozoa, researchers speculate that the disease could be passed via a carnivore host (most likely dogs). If so, cows could become infected from eating feed contaminated with feces from an infected carnivore.

There is no treatment for neospora infection, and we have limited knowledge about its transmission, so the control measures being developed are likely to evolve as more is learned about the disease.

A vaccine recently has been introduced, but information concerning its value in control programs is just now being developed. Control is aimed at removing carnivores from the environment to eliminate fecal contamination of feed and preventing any carnivores from eating placenta or dead calves to break the life cycle of the neospora organism.

Specific measures to control such transmission would include removing fetuses, dead calves and placentas from the farm, controlling rodents, and minimizing the number of cats and dogs exposed to the herd. Also recommended are covering feed to prevent contamination by bird and other animals' feces and removing feces from bulk-feed areas, feedbunks and bunk aprons.

e-mail: larsonr@missouri.edu