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Cattle Abortions - Causes and Prevention

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Abortions in cattle may result from a broad range of causes. Abortions may be idiopathic (occurring without known cause) or the result of metabolic or hormonal abnormalities, nutritional deficiencies, trauma, toxicities, or infectious processes. For this presentation, information collected from diagnostic laboratories in South Dakota, Nebraska and Wyoming has been summarized in order to distill this broad subject down to its most important aspects. This presentation will examine the various infectious causes of abortion and focus on those diseases which diagnostic results indicate are the most important contagious causes of abortion.

Before beginning the discussion of specific causes of abortion, it will be of value to understand some basic concepts concerning abortion in cattle.

BASIC CONCEPTS CONCERNING ABORTION IN CATTLE

Criteria for submission of aborted bovine fetuses for diagnostic evaluation.

- 1) When the abortion rate exceeds 3%
- 2) When a number of animals abort over a short period of time.

For your own peace of mind, you may want to submit all aborted fetuses so as not to miss a disease process that could represent a herd problem. However, from a practical standpoint, this is probably not necessary and will generally not be highly productive. Some estimates have put the "normal" abortion rate between 2-5%. If you have a number of cows, you are going to have an occasional abortion.

Two criteria can aid in deciding when abortions are cause for concern. As a general recommendation, the maximum tolerable abortion rate is considered to be 3%. An additional warning sign that may indicate a potential herd problem is an inordinate number of abortions over a short period of time. An occasional abortion is probably not cause for alarm. However, if the abortion rate exceeds 3% or a number of abortions occur over a short period of time, one or more of the aborted feti and placenta should be submitted to your veterinarian or diagnostic laboratory for a diagnostic workup.

Proportion of bovine abortions due to infectious processes.

Many producers need to change their mind-set when it comes to abortions in cattle. With many types of diseases, the condition is most often associated with an infectious process. Calf scours is almost always due to an infectious problem. Shipping fever is generally the result of a

bacterial and/or viral infection. However, this is not the case with abortions in cattle. As illustrated by figure 1, specific infectious agents are determined in only 31% of bovine abortions and evidence of an infectious process is identified in only 50% of beef cattle abortions. Though various infections do cause a significant number of abortions, an equal or greater number of abortions do not appear to be the result of an infectious process.

This brings up another important point. Abortion storms are not always associated with infectious processes. Most diagnostic laboratories concentrate on the identification of infectious causes of abortion. If several aborted feti (≥ 3) are submitted to a diagnostic lab and evidence for an infectious process is not identified, it is likely that the problem is associated with the large group of non-infectious causes of abortion.

*Figure 1: Causes of bovine abortion

- 2% - Anomalies
- 5% - Fungal
- 11% - Viral
- 15% - Bacterial
- 17% - Evidence for infection, etiology undetermined
- 50% - Idiopathic (no evidence for an infectious process)

(* From a ten year study on bovine abortions conducted at the South Dakota Animal Disease Research and Diagnostic Laboratory)

These are two general features of bovine abortions. If you have a number of cows, you are going to have abortions. If you are seeing a number of abortions in a short period of time or more than 3% of your cows are aborting, it is certainly time to seek diagnostic assistance. Following diagnostic assistance, don't anticipate that an infectious process will be identified because infections account for only 50% of all abortions.

Distribution of diagnostic cases.

Now that we have established some basic principles concerning bovine abortion, let's examine diagnostic laboratory data on the distribution of causes of abortion in cattle.

| | | | |
|-------------------------|---|----------|-------------------|
| Figure 2: | Bovine Abortion: Regional Distribution of Causes (percent of total bovine abortions) | | |
| | South Dakota | Nebraska | Wyoming |
| ^a Idiopathic | 50% | 53% | 49% |
| Bacterial | 15% | 10.4% | 11% |
| Viral | 11% | 10.4% | 28% |
| Fungal | | 5% | ^b NA1% |

^aIdiopathic = no evidence for an infectious process

^bNA = data not available

Figure 3: Bovine Abortion: Major Infectious Causes by Region
(percent of total bovine abortions)

| | South Dakota | Nebraska | Wyoming |
|----------------|--------------|----------|---------|
| Misc. Bacteria | 11.3 | 9.5 | 4.5 |
| *BVD | 4.6 | 5.2 | 27.2 |
| *IBR | 5.4 | 5.2 | 0.6 |
| Mycotic | 5.3 | -- | 0.9 |

Figure 4: Bovine Abortion: Distribution of Infectious Causes of Abortion in South Dakota (percent of total bovine abortions)

| | |
|----------------------|------|
| *IBR | 5.4% |
| Mycotic | 5.3% |
| *BVD | 4.6% |
| Actinomyces pyogenes | 4.2% |
| Bacillus sp. | 3.6% |
| *Listeria | 1.4% |
| E. coli | 1.1% |
| *Leptospira | 0.9% |

* = potentially contagious causes of abortion

A number of conclusions can be drawn from these results.

- a) A specific infectious process (etiologic agent) is determined in only 30-40% of cattle abortions (Figures 1 & 2).
- b) Of the infectious causes of abortion, 50% or less are caused by organisms that are contagious (Figure 4).
- c) Of the contagious causes of abortion, IBR and BVD are the most important. (Figures 3 & 4).

One of the important points that this data illustrates is that even within the category of abortions caused by infectious organisms, 50% or less are due to organisms that are contagious (can spread from cow-to-cow). Abortions caused by miscellaneous bacterial or fungal infections of the fetus or fetal membranes account for the remaining infectious abortions. Though these organisms cause a significant number of abortions each year, they are generally not cause for concern because they are sporadic and do not spread from cow to cow. Actinomyces pyogenes, Bacillus sp., E. coli, and the organisms responsible for fungal abortions are all continually present in the environment of the cow. Actinomyces pyogenes is a normal resident of the mucosa of the nasal cavity, conjunctiva and vagina. E. coli is present in fecal material. Bacillus sp. are common in the soil and dust. Fungi and fungal spores are present in the air and feed. All of these organisms are extremely common (ubiquitous) in the environment of the cow. They

occasionally get into the bloodstream of the cow, probably through small abrasions in the forestomachs. The cow, with her fully developed immune system, eliminates these invaders without difficulty. However, the immature defenses of the fetus may not be as able to eliminate these infections and the organism may become established in the fetus and/or placenta and cause an abortion.

Within the category of infectious causes of abortion, the majority of abortions are not cause for concern because the majority are not contagious. The bulk of infectious abortions are caused by organisms that are present in the environment of the cow and occasionally cause problems. If a report lists one of these organisms as the cause for the abortion, even though it is an infectious process, it is not cause for alarm because it will not spread from cow to cow and does not require preventative or therapeutic intervention. Good husbandry may help to diminish the incidence of these sporadic infections by decreasing exposure dose (clean, well ventilated environment) and helping to maintain adequate immune function in the cow (adequate nutrition and stress prevention).

Important Contagious Causes of Bovine Abortion.

As we approach the eradication of brucella and as more and more producers practice prophylactic vaccination, the incidence of the contagious causes of abortion continues to diminish. However, there are still several contagious causes of abortion that are cause for concern. Infectious Bovine Rhinotracheitis (IBR or "Red Nose) and Bovine Virus Diarrhea (BVD) account for approximately 10% of all abortions, almost 1/3rd of all infectious causes of abortions, and 81% of the contagious causes of abortion in South Dakota and Nebraska. BVD accounted for the preponderance of abortions in Wyoming. Obviously, IBR and BVD are two contagious causes of abortion that producers need to be aware of and take action to prevent.

Abortions caused by Bovine Virus Diarrhea (BVD).

BVD is an important cause of abortion in South Dakota and Nebraska and is by far and away the most important cause of abortion in Wyoming. In normal adult cattle the virus generally causes only a mild disease. However, in pregnant cattle infection of the fetus may result in abortions, fetal malformations, stillborn or weakborn calves. The most effective way of preventing fetal infection with BVD is by prebreeding vaccination with a polyvalent BVD vaccine.

Unfortunately, vaccination may not be 100% effective. If BVD abortions continue, despite a good vaccination program, there are two principle possibilities to consider: 1) a non-homologous strain of BVD virus is causing infection, or 2) persistently infected animals are present in the herd.

One of the difficulties in trying to protect animals against BVD is that there are a large number of different strains of BVD. Vaccines are generally made with several strains of BVD (polyvalent vaccines); however, the vaccines strains may not provide cross protection against all field strains of the virus. Because of this, it has occasionally been necessary to prepare an autogenous vaccine to protect animals against the particular strain that is causing the problem on

an individual farm/ranch.

Another serious problem with BVD is the presence of persistently infected animals. These animals shed large amounts of virus into the environment and are a constant reservoir of infection for the rest of the herd. Exposure to large doses of virus from persistently infected cattle may cause disease in unvaccinated animals and those that do not respond well to vaccination. Identification and elimination of persistently infected animals may be an important aspect of BVD control.

BVD is an important cause of abortion. Prebreeding vaccination is an effective method of preventing this disease. Unfortunately, the existence of numerous strains of the virus and the presence of persistently infected animals can complicate control of BVD.

Abortions Causes by Infectious Bovine Rhinotracheitis (IBR).

Infectious Bovine Rhinotracheitis (common names:IBR, red nose) is caused by a herpes virus. IBR most commonly causes an infection of the respiratory tract. In non-immune, pregnant cows, IBR can cause abortion. In herds that have not been exposed naturally and have not been vaccinated, IBR can cause serious problems. Abortion rates of 5-60% have been reported in IBR abortion "storms." The important point to remember about IBR abortion is that it can be readily prevented by prebreeding vaccination. This has to be prophylactic vaccination. Vaccination in the face of an outbreak of IBR will generally not prevent additional abortions. IBR generally spreads fairly rapidly within a herd. However, cows will not abort due to IBR until 23-53 days after exposure to the virus. By the time you see the first abortion, all of the cows will generally have been exposed and vaccination will not stop or prevent additional abortions. This is a very important point to realize about IBR. Pre-breeding vaccination with a modified live vaccine, or a two shot series with a killed product, is an extremely effective way of preventing abortions. If you fail to vaccinate and IBR spreads through the herd, you will not be able to stop an abortion storm by vaccination.

There are some cautions concerning vaccination for IBR. Do not use a modified live IBR vaccine on pregnant animals, unless the vaccine is a temperature sensitive intranasal vaccine. Modified live vaccines given to pregnant animals can result in abortion. Occasional problems are encountered when heifers are vaccinated only once with a killed product. This may not provide adequate protection unless the animal receives a booster.

Diagnostic results indicate that IBR and BVD continue to be the two most important contagious causes of abortion in our region. Over the past several years, the majority of abortion storms in beef cattle due to infectious problems have been associated with either IBR or BVD infection. Both these diseases are best prevented by prebreeding vaccination.

Summary:

- 1) An abortion rate of $\geq 3\%$, or a number of abortions over a short period of time is cause for concern and diagnostic assistance should be sought.

- 2) Though infectious causes are often suspected, $\leq 50\%$ of abortions are due to infectious processes.
- 3) Within the category of infectious abortions, $\leq 50\%$ are caused by organisms that are contagious (will spread from cow to cow).
- 4) Of the contagious causes of abortion, IBR and BVD continue to be the most important. These diseases are best prevented by vaccination.

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