

10) PREGNANCY AND CALVING

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PREGNANCY

Fertilization

Fertilization is the union of an ovum and a spermatozoon to produce the first cell of an embryo. Fertilization takes place in the oviduct. The embryo enters the uterus two to three days after fertilization, but will not attach to the uterus wall (implantation) before about 28 days.

Implantation

In part, implantation consists of the formation of about 80 to 100 structures where fetal tissue (cotyledon) and maternal tissue (caruncles) fold together. After calving, if the caruncles and the fetal tissue fail to separate, the placenta

cannot be expelled, leading to retained placenta. The process of implantation also includes the formation of the umbilical cord that allows exchange of nutrients and waste products between the maternal and fetal tissues. Implantation is usually completed by Day 45 of pregnancy.

Embryonic death

Until implantation is complete, the risk of embryonic death is high. It is estimated that from 10 to 20% of all pregnancies end in embryonic death. If death of the embryo occurs within the first 17 or 18 days after fertilization, the cow will return to heat on a regular schedule and the producer may not know that the animal was pregnant. Later embryonic death will result in a delayed return to heat. In this case, the cow has an "apparent" heat cycle of 30 to 35 days. Thus embryonic death may easily be mistaken for a cow's failure to conceive or come in heat.

Pregnancy check

Common methods to detect pregnancy include non-return of heat, rectal palpation and milk progesterone levels. Each method has its advantages and disadvantages.

Non-return to heat

A cow not returning to heat 21 days after insemination may be presumed pregnant. However, a cow may not return to heat because of an ovarian cyst or failure to notice that the cow came in heat. Thus

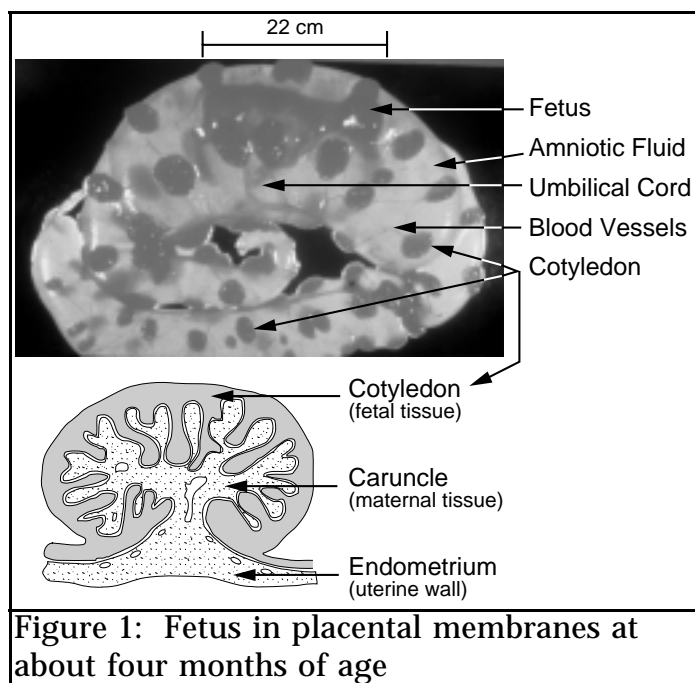


Figure 1: Fetus in placental membranes at about four months of age

when no other diagnostic tools are available, a cow is usually declared pregnant if no heat has been observed for at least 60 days (the time of about three normal cycles).

Rectal palpation

A veterinarian may use rectal palpation 40-60 days after insemination to detect the fetus in the uterus, other structures associated with pregnancy, and the presence of a corpus luteum on the ovary.

Milk progesterone

During pregnancy, the heat cycle is interrupted because the corpus luteum persists and continues to secrete progesterone throughout the pregnancy. The persistence of progesterone in the milk 21 to 23 days after insemination may be used as a diagnostic tool for pregnancy.

Growth of the fetus

Most fetal growth occurs in the last trimester of pregnancy (Days 190 to 282), during which time the fetal weight increases from about four kg to about 45 kg. Normal fetal growth requires nutrients and this increases the cow's nutritional requirements, especially during the last two months of pregnancy.

Abortion

Abortion is the expulsion of a non-viable fetus before the normal term of pregnancy. Abortion of an implanted fetus occurs in 3 to 5% of pregnancies. The major causes of abortion are:

- Insemination of a pregnant cow;
- Physical injuries (rough handling of pregnant cows);
- Ingestion of feed containing toxins, moldy feed, or feed with high levels of estrogen;
- Microbial infections (venereal diseases and other infections).

All cases of abortion should be viewed as potentially serious situations and

rigorous efforts should be made to arrive at diagnoses. Bacterial (brucellosis, leptospirosis, listeriosis and vibriosis, etc.), viral (BVD, IBR), protozoal (trichomoniasis) or fungal infections cause abortion between the fourth and seventh months of pregnancy.

CALVING

Calving, or parturition, is defined as the birth of a calf followed by the expulsion of the afterbirth (placenta). In the normal birth position, the fetus rests on its abdomen with its forefeet directed toward the uterine opening (the cervix) and its head resting between the forefeet (Figure 2). Abnormal presentation of the calf occurs once in about 20 calvings (5%).

Signs of calving

Signs of imminent calving include:

- Enlargement of the udder (with potential problems of edema);
- Relaxation of the pelvic ligaments;
- Discharge of the liquefied mucous plug that sealed the uterus.

Stages of calving

Stage 1: Dilation of the cervix

In general, this stage lasts from two to three hours in mature cows and four to six hours in heifers. During this stage, the cervix dilates because of the release of a hormone (oxytocin) and the pressure of the "water bag" against it. Thus early

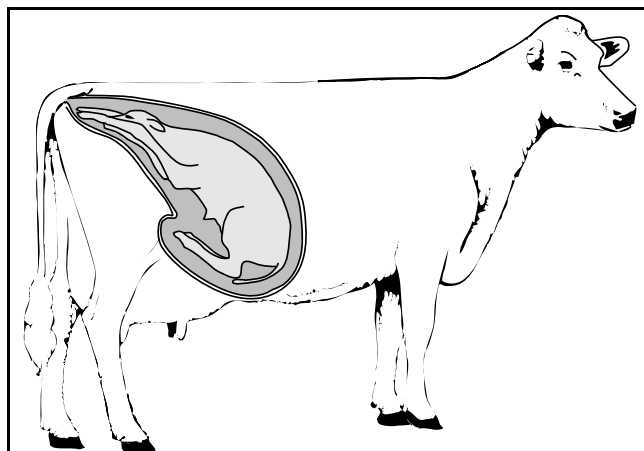


Figure 2: Fetal position before calving



Figure 3: Calf delivery

breakage of the "water bag" may delay the normal dilation of the cervix.

Stage 2: Delivery of the calf

The second stage is characterized by the progression of the calf through the birth canal and its expulsion. At this stage, the calf may still be enclosed in the second "water bag" (amniotic fluid). After the head has passed through the birth canal, the rest of the body usually demands little extra effort to be expelled. This stage may last from two to 10 hours. A common mistake is to attempt to assist by pulling on the forelegs of the calf unnecessarily or too early.

Stage 3: Expulsion of the placenta

During the third stage, the placenta or afterbirth is expelled from the uterus. After the delivery of the calf, uterine contractions continue for a period of time. These contractions help to break down the cotyledons by separating the placenta from the uterine caruncles (Figure 1). Normally, the afterbirth should be expelled within 12 hours of birth.

DEALING WITH A DIFFICULT CALVING

Experience and judgment are needed to decide when to assist a calving. After one or two hours of intense pushing, the forefeet of the calf should appear. If there are signs of distress, assistance should be provided. It is very important to wash and disinfect hands, arms, the cow's

vulva and all equipment used during assistance. The position of the calf must be checked first and, if necessary, corrected before using traction. Traction should be applied as the cow pushes.

AFTER CALVING

A process called uterine involution begins immediately after calving. The uterus shrinks in size considerably and layers of tissue must be renewed.

Although ovarian activity may lead to ovulation as early as 15 days after calving, this is usually not accompanied by heat (silent heat), and the first few cycles may be of short duration. However, more than 90% of cows should have been observed in heat at least once within 60 days of calving.

POST-CALVING COMPLICATIONS

Retained placenta

Retained placenta occurs in about 5 to 10% of otherwise normal calvings. The frequency of retained placenta increases with premature or difficult calvings, and also in the case of bacterial infections. The placenta should NOT be removed manually because of possible injury to the uterus and risk of permanent sterility. Efforts should focus on trying to avoid infections and stimulate uterine contractions (treatment with estrogen is sometimes successful). Prevention of retained placenta should be an active part of reproductive management because it is often followed by other complications. Prevention includes proper sanitation during calving and proper nutrition during the dry period.

Metritis

Metritis is an inflammation of the uterus most often due to an invasion of microorganisms. Metritis can frequently be diagnosed by a purulent vaginal discharge. A difficult calving or retained

placenta increase the risk of metritis. Unless metritis is severe, cows usually recover without any treatment in several weeks. In severe cases, the veterinarian may evacuate fluids from the uterus by rectal palpation followed by an infusion of the uterus with an antibiotic solution. When antibiotics are used, the milk has to be discarded, usually for a period of three or four days. An alternative treatment is to induce a heat using the hormone prostaglandin. During heat, uterine contractions help to clear the infection and minimize the need for antibiotics.

Pyometra

As in metritis, this problem involves an infection of the uterus. However, in the case of pyometra, the cervix is closed, preventing drainage of the infectious material from the uterus. The uterus fills up with pus and the cow does not come in heat. The damage caused by pyometra may lead to permanent sterility.

CALVING GUIDELINES

Good management practices are very effective at minimizing the stress at calving and calf mortality. Managing a dairy herd with an aim to minimize difficult calving is essential to a successful operation and requires the control of many factors:

- **Proper feeding:** Proper feeding of heifers is important because they should not be inseminated until they have reached proper body weight. Cows should not be overfed during the last part of lactation or the dry period because overconditioning (obesity) increases the risk of difficult calving.

- **Use a maternity pen:** A maternity pen should be reserved for about every eight cows in a herd. Thus a 40- to 50-cow herd should have six or seven individual maternity pens in which cows can move freely during calving. The pen should be dry, well ventilated and thoroughly cleaned after each calving.
- **Be patient but ready to call for veterinary assistance when trouble occurs:** Look for the early signs of calving and observe the progression of the calving. Give the cow adequate time to prepare herself for delivery; after one to two hours of intense pushing, the forefeet of the calf should appear. If there are no signs of progress and the cow begins to show signs of distress, check the position of the calf. If you are unable to determine the position of the calf or you are not sure of how to correct the problem, call for veterinary assistance immediately.
- **If the decision to assist the calving is made, use strict sanitary conditions:** When examining a cow, use strict sanitary procedures to minimize the risk of infection.
- **Provide good care to the newborn calf:** Clear the nostrils of mucus and make sure the calf is breathing. Tickling the inside of the nostril with a finger is usually sufficient to initiate breathing. If the lungs are obstructed by a large amount of mucus, the fluids may be cleared by holding the calf by the hind legs for a short period of time. Use a disinfectant to prevent infection of the umbilical region. Feed colostrum within a few hours after birth to help the calf gain immunity against infectious diseases.