



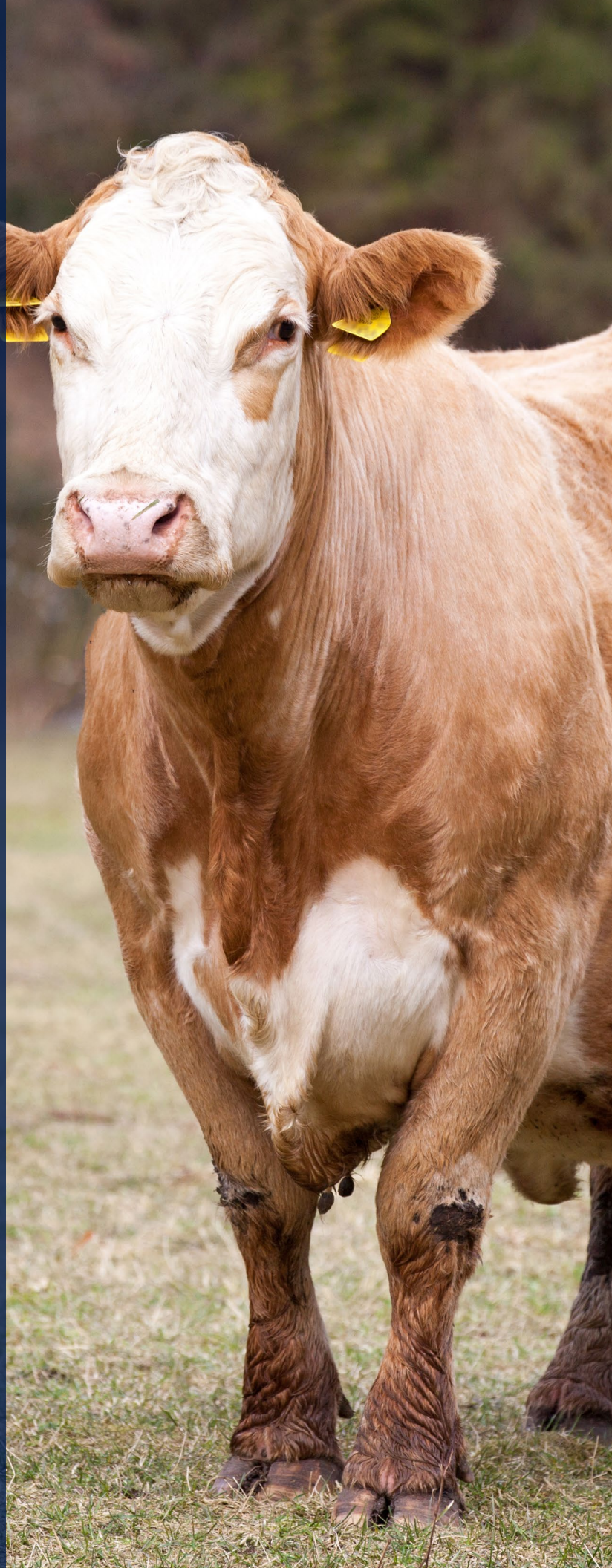
BEEF

Chapter 33

Understanding Calving and When Help Is Needed

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Chapter 33:

Understanding Calving And When Help Is Needed

Introduction

Parturition, or the process of calving, is a complex physiologic event that usually occurs without complication. When problems do occur, the health and survivability of the calf as well as the dam may be at risk. Cattle producers who have an understanding of the physiology of calving, as well as a clear understanding of when assisting the dam is necessary, will be better prepared to minimize unnecessary losses at calving time.

Initiation Of Parturition

The fetus itself is responsible for starting the chain of events that lead to calving. When the hypothalamus, pituitary gland, adrenal glands, and their hormonal connections are sufficiently mature, cortisol begins to be secreted from the calf's adrenal glands. Cortisol levels from the fetus rise dramatically in the last few days prior to calving. This reduces progesterone produced by the placenta, leading to the release of prostaglandin from the placenta, in turn leading to luteolysis and the beginning of the calving process.

Outside impacts on initiation of calving can alter time of calving. On a practical level, studies have demonstrated influence of feeding time, barometric pressure and outside temperature on calving time in beef herds. Feeding cows in the evening (4 PM to 6 PM) resulted in an increased percentage of cows calving during daylight hours (Jaeger et al., 2008), which may help producers more effectively direct resources towards monitoring or aiding cows during calving. Ambient conditions that were associated with the onset of calving in spring calving herds included rising barometric pressures and decreasing ambient temperatures (Troxel and Gadberry, 2012).

Stages of Labor

The parturition process is complex biologically; however, cattle producers are primarily concerned with the external manifestations of each stage. In cows and heifers, three stages of labor have been defined:

Key Points

- Understand and recognize the three stages of labor in cattle.
- Recognize when a cow or heifer should be examined during labor.
- Understand the important steps to examine a cow that is having trouble calving.
- Use proper techniques in assisting the calving process, including placement of chains and testing for delivery.
- Know what is important in the immediate aftercare of the calf and cow.

1. Stage 1. The outward signs of the first stage of labor are usually more pronounced in first-calf heifers than in older cows. Signs of discomfort such as restlessness, frequent lying down and rising, arching the back, tail switching, and kicking at the belly are all common manifestations of this stage. Most cows and heifers will separate themselves from the rest of the herd at this point.

The discomfort demonstrated by these behaviors is due to the beginning of uterine contractions, each one of which produces a slight sharp twinge of pain for the animal. At the beginning of stage 1, uterine contractions occur approximately once every 15 minutes and increase in frequency to about once every three minutes by the end of this stage. These contractions are not readily noticeable externally and should be differentiated from the abdominal contractions that occur in the next stage of labor.

Each uterine contraction results in the slight breakdown of the connection between the placenta and the uterus. If uterine contractions continue for a prolonged period of time, the fetus may experience a significant lack of oxygen as this connection is progressively disrupted. Therefore, stage 1 labor that does not progress may result in a calf born with oxygen deficits.

The end of stage 1 is marked by the rupture of the chorioallantoic membrane (first water bag) and release of the allantoic fluid (“breaking water”) through the cervix, which is now starting to dilate. The normal duration of stage 1 is two to six hours, although this stage may last much longer (as long as 24 hours) in first-calf heifers.

2. Stage 2. This stage of labor is characterized by the delivery of the calf. It commences when the cervix is fully dilated with the second water bag (amniotic membrane) and parts of the fetus entering the birth canal. This stimulates further uterine contractions, but also is the impetus for the cow to begin strong abdominal contractions. When abdominal contractions

commence, the cow typically will lie down and may alternate between lying and standing. As stage 2 labor progresses, the frequency of abdominal contractions increases from about one contraction per minute to three contractions per minute.

A great degree of abdominal effort results in the fetal head being pushed past the cow’s vulva. In many cases, once the head is delivered, the rest of the calf follows with minimal additional effort on the part of the cow. For bigger calves, the cow frequently will provide additional effort to deliver the shoulders and/or hindquarters of the calf. Many cows will take a short rest from straining after the calf’s shoulders are delivered through the pelvic canal.

As soon as the calf’s shoulders are through the birth canal, the umbilical cord is compressed against the floor of the cow’s pelvis. It is usually at this point that the calf makes the transition from utilizing oxygen from umbilical cord circulation to breathing on its own. If the calf’s head is covered by the water bag at this point, it is possible that suffocation may result.

Stage 2 labor normally lasts anywhere from ½ hour to 4 hours. This stage can take even longer in heifers because more effort is needed to dilate the tissues that comprise the birth canal.

3. Stage 3. During stage 3 of labor, the attachments of the placenta and fetal membranes to the uterus break down and are expelled. Following delivery of the calf, uterine contractions continue and decrease gradually over the following several days. Typically, these membranes are expelled by the cow by 8 to 12 hours following calving. Intervention to remove placental tissues from a newly-calved dam should be avoided, as damage to the uterine lining may occur as a result of manipulation. If signs of systemic illness or uterine infection occur in a cow following calving, a veterinarian should be consulted for treatment options; otherwise, healthy-appearing cows will eventually pass these retained fetal membranes without adverse effects.

Knowing When to Intervene

Knowing the normal process of parturition is key to understanding when the process is not proceeding normally and when intervention is necessary.

Producers will understand the impact of making timely and accurate calving intervention decisions on the survivability of the calf. However, longer term effects on the cow are also affected by these decisions. For example, research indicates that after 1.5 hours of stage 2 labor, every 30 minute delay in assistance resulted in a 6 day longer interval to the next subsequent pregnancy (Doornbos et al., 1984). In addition, assisting earlier in stage 2 labor resulted in more cows initiating estrus cycles before the breeding season (Doornbos et al., 1984) and greater pregnancy rates during the breeding season (Doornbos et al., 1984; Bellows et al., 1988). Calves from dams assisted early had increased average daily gain compared to cows that were not assisted unless the calf had to be pulled or delivered by cesarean section (Bellows et al., 1988).

In general, cattle producers should restrain and examine a cow to determine the cause of dystocia (abnormal calving) when:

- **A cow or heifer is in stage 1 labor for eight or more hours.** Since stage two labor is initiated by presentation of parts of the fetus to the cervix, conditions that do not allow this to happen may result in prolonged stage 1 labor. These conditions may include milk fever, hormonal abnormalities, uterine torsion, and over-stretching due to large or multiple fetuses. While abdominal contractions do not begin in this case, the uterine contractions do continue. Prolonged uterine contractions may result in premature separation of the placental/uterine connection as described above, ultimately causing oxygen deprivation or fetal death.
- **The second water sac has been visible for two hours without the cow trying.** The emergence of the second water sac signals the beginning of stage 2 labor, during which time the cow should be making abdominal contractions to deliver the calf.
- **The cow has been trying for over 30 minutes**

with no progress. Delivery during stage 2 labor should progress with help from the cow's abdominal contractions.

- **The cow has been trying and delivery is progressing, but she stops for more than 15 minutes.** Cows may be expected to take "breaks" during a challenging delivery, but those breaks should not be over 15 minutes in duration.
- **Signs of distress are present in the fetus or the cow.** These signs may include:
 - Swollen tongue or head in the fetus
 - Appearance of fetal membranes before the calf
 - Severe bleeding from the rectum or birth canal of the cow
 - Abnormal delivery postures or presentations (backwards calf, presentation of only one leg, etc.)

Detection of any of these circumstances, especially when it comes to time estimates, is dependent upon the skill and experience of the observer, but also upon the frequency at which animals are observed. As a rule of thumb, cattle producers should consider observation of animals during calving season a minimum of once every three hours.

Examining the Cow

Once a decision has been made to examine the cow or heifer, several considerations should be made:

1. **Restraint.** The cow should be restrained in a manner that is safe for the animal as well as the examiner. The appropriate method of restraint will depend upon the attitude of the animal. The examiner should anticipate that the cow may lie down during the examination, so a typical squeeze chute is not always the most appropriate choice. Head restraint with a halter is a very good choice, but headgates may be used if precautions are taken such that the cow's airway is not obstructed and that she can breathe upon lying down. The headgate should be attached to panels that can freely swing out on both sides of the animal should she go down during examination or delivery.

2. Cleanliness. The perineal (rectal/vaginal) area of the cow should be cleaned with water and surgical soap and rinsed. The examiner should wear plastic shoulder length OB sleeves.
3. Lubrication. A sufficient amount of OB lubricant should be applied to the examiner's hand prior to the vaginal examination.
4. Examination. The examiner should insert a lubricated hand into the vaginal canal to ascertain the presentation (forwards vs. backwards), position (right-side up vs. upside-down), and posture (relation of calf's legs and head to its body).
5. Check for calf viability. An assessment of whether the calf is dead or alive will indicate the relative urgency of the interventions to follow. If the calf is not alive, the timeliness of delivery is not as critical, and attention then shifts to the health of the dam. Calf viability may be determined by noting the presence or absence of fetal reflexes, including:
 - Withdrawal reflex – calf withdraws the limb after it is pinched between the toes.
 - Suckling reflex – calf moves its tongue or mouth in response to placing a finger in the mouth. Both this reflex and the withdrawal reflex may not be present if the fetus is wedged within the birth canal.
 - Eye reflex – calf's eye or eyelid moves upon the examiner pressing lightly upon the eye with a finger.
 - Fetal heartbeat – examiner may feel the heartbeat of the calf by running a hand along the calf's chest.

Extremely vigorous responses to these stimuli or exaggerated movements of the calf during the examination typically mean bad news. These movements are oftentimes agonal, occurring in the last moments prior to death in the case of hypoxic calves.

Assisting the Delivery

Once the examination has been performed, the decision must be made whether the problem can be corrected with the equipment and personnel at hand, or whether more advanced assistance should

be sought. This could be a veterinarian or a fellow cattle producer with more experience in assisting dystocia cases. Help should be sought in the following cases:

- The cattle producer has examined the cow but cannot determine the problem.
- The problem has been identified but the cattle producer is not able to correct it.
- Attempts to correct the problem have been ongoing for 30 minutes without progress towards a solution (consider sooner if the calf is still alive).

Detailed instructions for correcting the wide variety of conditions that contribute to dystocia are beyond the scope of this chapter. Once the calf is determined to be positioned correctly for delivery (head and both forelimbs present in the birth canal, or in the case of a backwards presentation, both hindlimbs present in the birth canal), the decision of whether the calf may be safely delivered by extraction ("pulling the calf") next needs to be made.

Chains are preferred to straps to apply traction to the limbs of the fetus, as they are easier to clean thoroughly. Chains should be applied in a double loop, with the loop of the chain above the fetlock, and a half-hitch forming another loop above the hoof (Figure 1).

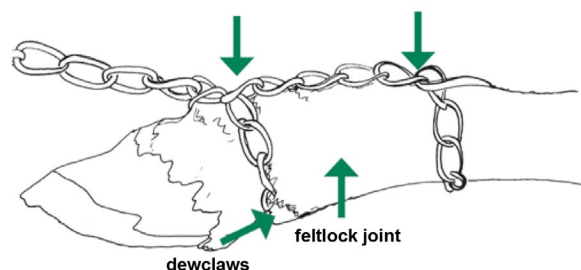


Figure 1: Proper placement of OB chains on the fetal limb.
Picture credit: Alabama Cooperative Extension

Mechanical calf pullers have the potential to exert a great deal of force upon a fetus, and therefore can cause injury to the calf, dam, or both, if used improperly. One should never use the calf puller to determine whether a calf can be safely delivered or not, as the force used in doing so may cause injury and undue stress to the fetus. A test for delivery can

be performed by having one person put traction on each forelimb of the calf, assuming the head of the calf is in the pelvic canal also. If both of the calf's legs can be pulled out to the point where the fetlock extends past the cow's vulva one hand width (Figure 2), then the calf can be safely pulled using a mechanical calf puller without undue force exerted on the calf or cow.

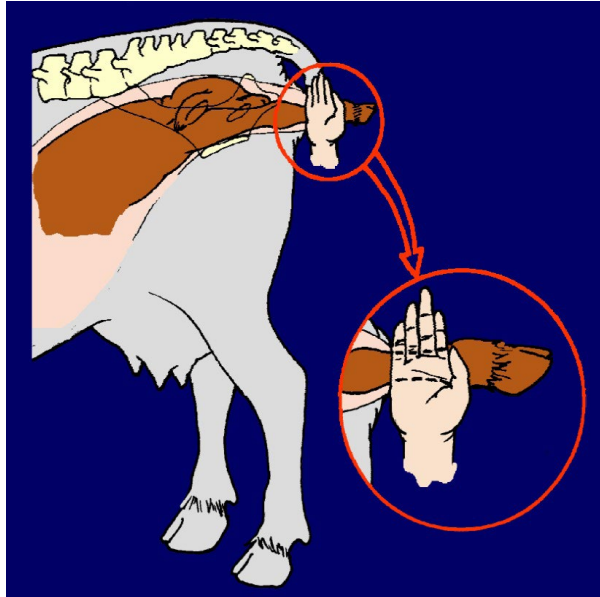


Figure 2: Test for delivery before mechanical extraction. Fetal limbs should be able to be manually pulled such that the fetlock extends a hands-width past the cow's vulva. Picture credit: Don Connor, University of Missouri.

This rule of thumb will seem very conservative to many experienced calving assistants. However, if the ultimate goal is a calf that is alive and not stressed upon delivery, and a cow that is not stressed or injured in the process, this rule of thumb will serve very well.

For deliveries of live calves that fail this test, delivery by caesarean section should be performed. The probability of a successful C-section, defined as delivery of a live calf and a cow that heals up well and re-breeds, is determined primarily by the timeliness of the decision to perform surgery. If the calf has been dead for any length of time prior to delivery, a fetotomy (surgically splitting up the fetus) with subsequent delivery is more desirable for cow survivability.

While assisting delivery, the optimal positioning for the cow is for her to be lying down on her right

side. While it may work to assist the cow while she is standing, cattle producers should consider the very likely possibility that the cow will go down during the procedure and ensure that there is ample room when this happens.

Generous amounts of OB lubricant should be applied to the fetus and uterus prior to delivery. The benefit of lubricant in these cases should not be underestimated, and it is very difficult to use too much. As the delivery process proceeds, the lubricant may need to be reapplied.

Traction, whether manually with OB hooks on the chains, or with a mechanical calf puller, should be applied straight back with a slight upward direction. Differential traction, beginning with the down (left) leg of the calf, should be applied until both shoulders have entered the cow's pelvic canal. Then steady traction can be applied to both legs simultaneously. It has been noted that once the calf's chest is exposed outside the cow, a short break in pulling can be taken to allow the calf to begin breathing.

It is at this point that the calf may need to be rotated slightly in order to allow his hips to clear the cow's pelvic canal. Steady traction is then re-applied until the hips clear the cow's pelvic canal and vulva, and the calf is delivered.

Following the Delivery

Two things should happen immediately after the delivery of the calf. The calf should be stimulated to breathe through use of vigorous rubbing of the chest or through stimulating a breath with a piece of straw inserted in the nostril. Under no circumstances is it advised to lift and hang the calf by the rear legs to drain fluid out of the respiratory tract. The vast majority of fluid removed by this procedure is from the gut and not from the lungs. In addition, this shifts the weight of the abdominal organs downward on the diaphragm and chest, hindering the ability for the calf to breathe. The best position for ease of respiration is for the calf to lie straight up on his sternum with the front legs tucked underneath.

In the frenzy to stimulate the calf to breathe however, the cow is often temporarily neglected. In cases of prolonged labor, the muscular tissue in the

uterus often becomes flaccid. The result may be a prolapse of the uterus, where the organ inverts and is pushed outside the body. This life-threatening condition can be avoided by quickly getting the cow to stand up (if she lay down during delivery), getting the aid of gravity and making it difficult for the cow to expel the uterus.

Cow problems following calving

A prolapsed uterus occurs in the manner described above, immediately following delivery and can occur when delivery has or has not been assisted. These should be differentiated from vaginal prolapses, which normally occur prior to calving. In contrast to a vaginal prolapse, a uterine prolapse is a medical emergency and must be tended to immediately. Blood from the cow's circulation pools in the uterus and may result in cardiovascular shock and death. Treatment involves administration of epidural anesthesia, thoroughly cleaning the prolapsed uterus, replacing it back into the pelvic canal, and ensuring that it is completely inverted once back inside the cow. Purse-string sutures may be placed to retain the uterus, but in many cases these are not necessary if the uterus is replaced and inverted completely. A veterinarian should be called or at the very least consulted when producers encounter uterine prolapses.

Calving paralysis is another sequelae to the calving process. This occurs when portions of the fetus are lodged in the cow's pelvis for an extended period of time. This compresses the blood and nerve supply to the pelvic tissues. The obturator nerves, large nerves important to the function of the rear limbs, pass through the pelvic canal and may be damaged during prolonged labor. The result is a cow that cannot rise or use her rear limbs immediately following calving. A veterinarian should be consulted in these cases. Many of these cases are temporary and will respond to supportive treatment and care, while some may be permanent in nature. In general, calving paralysis is more common in heifers than in cows due to their relatively smaller pelvic areas.

Milk fever, or parturient paresis, is relatively uncommon in beef breeds of cattle, but as genetics move towards higher-milking lines, it has the potential to become a more frequent issue. Milk

fever occurs when calcium is rapidly mobilized from the cow's bloodstream into the milk-production apparatus of the cow around the time of calving. The result is a generalized weakness that will not enable the cow to effectively rise. Milk fever can be easily treated with intravenous infusions of calcium products, allowing the cow to rise and equilibrate her blood calcium once she begins eating again. Milk fever is differentiated from calving paralysis by the fact that the cow often is able to rise immediately after calving, only to become weak and go down several hours later. Milk fever is essentially non-existent in heifers, as their calcium metabolism is still geared up for their own growth. A veterinarian should be consulted when milk fever is suspected.

Summary

Fortunately, the vast majority of calvings take place naturally without complications. When problems do occur, cattle producers can minimize adverse effects on both the cow and calf by having a thorough understanding of the stages of labor and how to respond to difficult situations. Prompt and appropriate intervention, including knowing when to call for assistance, will help ensure a good start for the calf and a speedy recovery for the cow.

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